MIDDLE FORK GOODNEWS RIVER WEIR, 2002

By

Jeffrey L. Estensen

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AUTHOR

Jeffrey L. Estensen is an Assistant Area Management Biologist for the Kuskokwim Area and the project leader for the Middle Fork Goodnews River weir project. The author can be contacted at the Alaska Department of Fish and Game, Commercial Fisheries Division, P.O. Box 1467, Bethel, AK 99559.

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ABSTRACT

The commercial effort, harvest, and the age, sex, and length (ASL) composition of chinook salmon, *Oncorhynchus tshawytscha*, sockeye salmon, *O. nerka*, coho salmon, *O. kisutch*, and chum salmon, *O. Keta*, harvested from District W-5 are summarized for the 2002 season. Escapement and escapement ASL composition for chinook, sockeye, chum, and coho salmon are summarized for the Middle Fork Goodnews River Middle Fork)) for the 2002 season. Escapement estimates for chinook, sockeye, and chum salmon in the Goodnews River are summarized for the 2002 season. A resistance-board floating weir was used in the Middle Fork to estimate chinook, sockeye, chum, and coho salmon escapement, and to provide a platform for the collection of age, sex, and length data. Chinook, sockeye, and chum salmon abundances in the Goodnews River were estimated by expanding aerial survey counts by the Middle Fork weir index. Chinook and sockeye salmon did not achieve their escapement goals at the weir. Chinook salmon was the only species to achieve its aerial survey escapement goal in the Goodnews River. Chinook, sockeye, and chum salmon did not meet their escapement goals in the Middle Fork. No aerial surveys were flown for coho salmon. The percentage of age 1.2 chinook salmon harvested in District W-5 was 15% greater than the overall total, while the percentage of age1.3 fish was 13% less than the overall total. The percentage of age 1.3 sockeye salmon harvested in District W-5 was 21% below the overall total, while the percentage of age 1.3 in the weir escapement was 44% below the overall total. The percentage of age 0.3 chum salmon escapement at the weir was 25% below the overall total, while the percentage of age 0.4 fish was 22% above the overall total. Commercial harvest and escapement ASL information for coho salmon were not available at the time of this writing.

KEY WORDS: Goodnews River, Kuskokwim Area, Kuskokwim Bay, resistance board floating weir, escapement monitoring, chinook, sockeye, chum, pink, coho, *Oncorhynchus tshawytscha*, *Oncorhynchus nerka*, *Oncorhynchus keta*, *Oncorhynchus gorbuscha*, *Oncorhynchus kisutch.*

INTRODUCTION

Area Description

Goodnews Bay is located in southern Kuskokwim Bay, approximately 80 mi south of the mouth of the Kuskokwim River, in southwestern Alaska. The Goodnews River drainage is the primary salmon spawning drainage in the Goodnews Bay area. The Goodnews River drainage consists of three river channels that originate in the Ahklun Mountains and flow southwesterly until converging, and then empting into Goodnews Bay (Fig. 1). The rivers drain approximately 1,000 m^2 (2,600 km^2) of surface land area.

The Goodnews River, the major branch, flows for approximately 25 miles (40.2 km) within the boundaries of the Togiak National Refuge, continues another 22 mi (35.3 km) outside the refuge until emptying into Goodnews Bay. The upper half of the Goodnews River is primarily a single channel river draining mountainous area, while the lower half is braided and drains largely undisturbed tundra. The surrounding riparian areas are composed primarily of cottonwood, willow, and alder.

The Middle Fork Goodnews River (Middle Fork) is a 42 mi (67.6 km) long tributary which parallels the Goodnews River before joining it near the mouth. The upper 27 mi (43.8 km) of the Middle Fork flows within the boundaries of the Togiak National Refuge, while the remaining 15 mi (24.1 km), flows outside the boundaries. The upper half of the Middle Fork is primarily a single channel river draining mountainous terrain; the lower half is a single channel draining largely undisturbed tundra. The surrounding riparian vegetation is composed primarily of cottonwood, willow, and alder.

Salmon Fisheries

The District W-5 commercial salmon fishery was established in 1968. Its boundaries extend from the southern most tip of the north spit to the northern most tip of the south spit at the entrance of Goodnews Bay, and expand east to a line between the mouth of Ukfigag Creek and the mouth of the Tunulik River (Fig 2).

Within the Kuskokwim Area, permit holders have unrestricted movement between commercial fishing districts. Permit holders from Goodnews Bay, Quinhagak, villages on the lower Kuskokwim River, and villages on the upper Kuskokwim Bay participate in the DistrictW-5 commercial fishery. In recent years, however, permit holders fishing the district have primarily been from the Goodnews Bay area. The majority of the permit holders fishing the district participate in the sockeye salmon directed fishery. Commercial fishing in the district is conducted with drift gillnets in the tidal channels radiating into the bay from surrounding freshwater streams. The fishery is directed towards sockeye salmon, *Oncorhynchus nerka*, and coho, *O. kisutch*, salmon. Chinook salmon, *O. tshawytscha*, and chum salmon, *O. keta*, are harvested incidentally. Pink salmon, *O. gorbuscha*, is the least valuable species commercially and has not been targeted in recent years.

The number of salmon harvested and the number of permits participating in the fishery increased in the late seventies, reaching an apex in the late eighties and mid-nineties. During that time, commercial harvests ranged from 33,781 to 166,053 fish (Appendix 1), averaging 85,193. During

that same time, the number of permits fishing the district ranged from 30 to 125 (Appendix 2), averaging 80. Since 1997, the District W-5 commercial fishery has been in a steady decline. From 1997 through 2001, commercial harvests ranged from 38,834 to 66,648 fish (Appendix 1), averaging 51,645, while the number of permits fishing the district ranged from 32 to 73 (Appendix 2), averaging 51. The decline in the fishery is likely attributable to the combination of below average runs of chinook and sockeye salmon, the poor market value of salmon, increasing fuel prices, and other economic opportunity in the area.

Since 1991, the exvessel value of the District W-5 commercial fishery has ranged from $24,802 to $649,747 (Appendix 3), averaging $272,797. On average, sockeye salmon are the most valuable species in terms of contribution to the total exvessel value, followed by coho, chum, and chinook salmon. Pink salmon have not been commercially harvested in recent years.

Subsistence fishing for salmon occurs throughout the Goodnews River drainage, and in other freshwater streams throughout the district. Subsistence caught salmon are an important food source for the local residents in the area, making a vital contribution to their annual subsistence harvest. The department has quantified subsistence harvests in Goodnews Bay since 1968. Annual subsistence harvests average 744 chinook salmon, 729 sockeye salmon, 311 chum salmon, and 724 coho salmon (Burkey et al 2001).

Sport fishing occurs throughout much of the Goodnews River drainage. Since the department began its statewide sport fish harvest survey in 1991, the estimated combined harvest and delayed mortality associated with catch and release has ranged from 31 to 590 chinook salmon, 13 to 672 sockeye salmon, 0 to 425 chum salmon, and 152 to 1,398 for coho salmon (Lafferty in press). A 5% delayed mortality is assumed (Bendock and Alexandersdottir 1992) as single hook artificial lure regulations have been in place throughout much of the nineties.

The exploitation of the Goodnews River drainage salmon stocks has ranged from 16% to 71% (Appendix 4), averaging 34% for chinook salmon; 9% to 43 % (Appendix 4), averaging 24%; for sockeye salmon; and 6% to 38% (Appendix 4), averaging 20% for chum. Exploitation of the coho salmon stocks has not been determined because of the lack of drainage wide escapement information. There are several years since 1981 where the subsistence and/or sport fish harvests were unavailable. In those years, exploitation was based on available harvest information only.

Escapement Monitoring

The Goodnews River drainage is the primary salmon spawning drainage in District W-5. Salmon primarily spawn in the Goodnews and Middle Fork rivers and their associated lakes. It is believed that less than 10% of the salmon returning to the Goodnews River drainage spawn in the South Fork Goodnews River.

Salmon escapement into the Goodnews River drainage is monitored at a resistance board weir located on the Middle Fork, and by aerial surveys flown over the drainage. The Middle Fork weir (weir) is the third oldest salmon escapement assessment project in the Kuskokwim Area. The project was initiated as a counting tower in 1981 and was operated through 1990 (Schultz 1982, 1984a, 1984b, 1985, 1987; Schultz and Burkey 1989; Burkey 1989, 1990). Although successful, the tower

was limited by problems with species apportionment and high labor costs (Menard 1999). In 1991, resources were redirected towards a fixed-panel weir that operated through the mid-season of 1997. The fixed-panel weir greatly reduced labor costs and improved species identification. However, the fixed panel weir was limited by frequent high water level that often exceeded the height of the panels, rendering the weir inoperable. In some years during high water, the weir required dismantling to prevent its dislodgment. In July 1997, the fixed-panel weir was replaced with a resistance-board floating weir designed to withstand high water levels (Menard 1998). The weir is located approximately 11 mi (18 km) from the District W-5 commercial fishery (Fig. 1). Using a resistance-board weir has allowed the project to remain operational during high water events, and to operate into September, traditionally a period of high water level. Chinook, sockeye, and chum salmon escapements in the Goodnews River are estimated by expanding aerial survey counts of each species by the weir index.

The project typically begins operation during the third week in June (Appendix 5). Pre-operation passage estimates are made post-season for chinook, chum, and sockeye salmon (Appendix 5). Respective pre-operation estimates are based on comparing current year run timing with historic run timing models.

Escapement Goals

Salmon escapement objectives for the Middle Fork counting tower were established in 1984 as ranges set at 3,000 to 4,000 fish for chinook, 35,000 to 45,000 fish for sockeye, and 13,000 to 18,000 fish for chum salmon (Schultz, 1984b). An escapement objective was not established for coho salmon as the project typically ceased operation in mid-August (the coho salmon run in the MFGR extends through September and into October). In 1989, the sockeye salmon escapement objective range was lowered to 20,000 to 30,000 fish. An evaluation of the sockeye salmon exploitation rate in previous years indicated that historical harvest levels could be maintained with a reduced escapement objective (Burkey, 1990). These ranges remained in place when the tower was replaced with the fixed picket weir in 1991.

In 1993, Sustainable Escapement Goals (SEGs) for chinook, sockeye, and chum salmon were established for the weir (Buklis 1993). The respective SEGs were set as the midpoints of the tower escapement objective ranges: 3,500, 25,000, and 15,000 for chinook, sockeye, and chum salmon, respectively. A SEG was not established for coho salmon at the Goodnews weir because insufficient historical escapement and run timing data was available. The current SEGs for chinook, sockeye, and chum salmon at the weir are under review.

Stock Status

Since 1981, chinook salmon escapement at the weir has ranged from 1,395 to 6,022 fish (Appendix 4), averaging 3,190. In response to chinook salmon escapement concerns during the late eighties, beginning in 1990, the opening of the District W-5 commercial fishery was delayed until late June to increase chinook salmon escapement into the Goodnews River drainage. Since then, chinook salmon escapement at the weir has averaged 3,409 fish. Chinook salmon have achieved their current escapement goal seven times since 1981, and five times since 1990. Drainagewide escapement has ranged from 3,757 to 20,420, averaging 9,437. A drainage wide escapement goal has not been established for chinook salmon.

Sockeye salmon escapement at the weir has ranged from 15,799 to 58,264 fish (Appendix 4), averaging 36,749. Sockeye salmon have achieved their escapement goal seventeen times since 1981. Drainage wide escapement has ranged from 52,603 to 178,870 fish, averaging 108,823. A drainage wide escapement goal has not been established for sockeye salmon.

Chum salmon escapement at the weir has ranged from 6,410 to 40,450 fish (Appendix 4), averaging 20,594. Chum salmon have achieved their escapement goal fourteen times since 1981. Drainage wide escapement has ranged from 22,209 to 146,834 fish, averaging 71,644. A drainage wide escapement goal has not been established for chum salmon.

Prior to 1997, coho salmon escapement counts were incomplete as the project typically ceased operation in August (the coho salmon migration into the Goodnews River drainage extends into October). The extension of the operation of the weir into September beginning in 1997 has allowed for the nearly complete enumeration of their migration past the weir. Since 1997, coho salmon escapement at the weir has ranged from 9,611 to 34,441 fish (Appendix 4), averaging 20,377 fish. Aerial surveys for coho salmon in the Goodnews River are problematic because of poor weather condition inherent to the area in September and October. As a result, there is no escapement information for coho salmon escapement in the Goodnews River.

Aerial Surveys

Aerial surveys have been used to observe salmon abundance trends in the Goodnews drainage since 1980. Aerial survey SEGs for chinook, sockeye, chum, and coho salmon were established in 1993 for the Goodnews River and Lakes, and the Middle Fork Goodnews River and Lakes (Buklis 1993). Aerial survey escapement goals for the Goodnews River and Lake are set at 1,600 chinook, 15,000 sockeye and 17,000 chum, and 15,000 coho (Buklis 1993). Aerial survey escapement objectives for Middle Fork Goodnews River and lakes are set at 800 chinook, 5,000 sockeye, 4,000 chum, and 2,000 coho salmon (Buklis 1993). Aerial survey data for all species has been sporadic since 1991 (Appendix 6), making it difficult to base any conclusions on abundance trends from survey results. The aerial survey SEGs for chinook, sockeye, chum, and coho salmon for the Goodnews River and Lakes and Middle Fork Goodnews River and Lakes are under review.

Age, Sex, and Length

Annual escapement and commercial harvest age, sex, and length (ASL) composition information is used to develop stock-recruitment models, in turn providing information for projecting future run sizes. A complete review of ASL information for chinook, sockeye, coho, and chum salmon data collected at the weir and from the District 5 commercial harvests can be found in Dubois and Folletti (unpublished).

Chinook salmon escapement ASL data has been collected at both the weir and from the District W-5 commercial harvest since 1990. Overall 63% of the chinook salmon return to the Middle Fork as males, and 56% of the chinook salmon harvested in the District W-5 commercial fishery are male. The age composition of chinook salmon returning to the Middle Fork are mainly age-1.4 fish (43%), while 27% and 26% return as age-1.3 and 1.2 fish, respectively. The mean lengths of the age-1.4 fish have been 865 and 858 mm, males and females, respectively. The age composition of chinook salmon harvested in the District W-5 commercial fishery are mainly age-1.3 fish (45%), while 30% are age-1.4 fish, and 23% are age-1.2 fish. The mean lengths of age-1.4 fish have been 843 and 855 mm, males and females, respectively.

Sockeye salmon escapement ASL data has been collected at the tower or weir since 1984, and from the District W-5 commercial harvest since 1985. Overall 50% of the sockeye salmon returning to the Middle Fork are males. Sockeye salmon returning to the Middle Fork have been comprised mostly (75%) of age-1.3 fish. The mean lengths of age-1.3 fish have been 581 and 547 mm, males and females, respectively. Overall 54% of the sockeye salmon harvested in District W-5 have been male and comprised primarily (73%) of age-1.3 fish. Mean lengths of age-1.3 fish have been 594 and 562 mm, males and females, respectively.

Chum salmon escapement age and sex data has been collected at the weir since 1990 and length data has been collected since 1995. Overall 52 % of the chum salmon have returned as males. Chum salmon returning to the Middle Fork have been comprised mostly of age 0.3 fish (68 %) and age-0.4 fish (31 %). Overall the means lengths of age-0.3 fish have been 593 and 561 mm, males and females, respectively, and for age-0.4 fish, 619 and 581 mm, males and females, respectively. Since 1984, ASL has been collected from chum salmon harvested in District W-5. Since then, chum salmon harvested in the district have been primarily female (51 %), with the total harvest having been comprised mostly (51 %) of age-0.3 and age-0.4 (49 %) fish. Mean lengths of age-0.3 fish have been 591 and 567 mm, males and females, respectively. Mean lengths of age-0.4 fish have been 612 and 583 mm, males and females, respectively.

Coho salmon escapement age and sex data has been collected at the weir project since 1991, and length data has been collected at the project since 1995. Overall 49 % of the coho salmon return to the Middle Fork as males. Coho salmon returning to the Middle Fork have been comprised mostly (91 %) of age-2.1 fish. Since 1995, the mean lengths of age-2.1 fish have been 594 and 597 mm, males and females, respectively. Age and sex data has been collected from the District W-5 commercial harvest since 1990, and length data has been collected since 1996. Since 1990, 52 % of the coho salmon harvested in District W-5 have been male, and 89 % of the total harvest was made up of age-2.1 fish. Since 1996, the mean lengths of age-2.1 fish have been 616 and 609 mm, males and females, respectively.

Objectives

The annual objectives for the Middle Fork Goodnews River weir in 2002 were to:

- successfully install and operate the weir from mid-June through September,
- enumerate the daily passage of all fish species through the weir,
- characterize the run-timing of chinook, sockeye, chum, and coho salmon through the weir,
- collect samples from chinook, sockeye, chum, and coho salmon at the weir for age-sex-length (ASL) determination,
- collect samples from chinook, sockeye, chum, and coho salmon from the District W-5 commercial harvest for ASL determination,
- enumerate the carcasses of all fish species washed up on the weir,
- record daily environmental and hydrological conditions at the weir site.

METHODS

Project Site Description

The weir is located on the Middle Fork Goodnews River approximately 15 mi from the District W-5 commercial fishery. The site is located in a straight riffle section of the river approximately 150 ft below a cut bank. The channel width is approximately 150 ft. The river substrate is primarily cobblestone, gravel, and sand. Water discharge from June through September ranges from approximately 500 to 1,500 cfs, while water velocity ranges from approximately 2 to 4 ft/sec. The water depth at the site ranges from approximately 1 to 4 ft. There is an exposed sandbar approximately 100 ft below the site.

Resistance Board Floating Weir

The design, construction, and procedures for the installation of the resistance-board floating weir largely follow those described in Tobin (1994). The 130 ft (39.6 m) weir used at the Middle Fork site was comprised of four major parts: the resistance board panel section, the fixed panel sections, the fixed picket sections, and the substrate rail.

The 65 ft (19.8 m) resistance board panel section was comprised of 4 ft (1.22 m) wide and 20 ft (6.10 m) long resistance board panels constructed out of 18 PVC Schedule 40 pipes (1 in diameter) with 2 ft (.61 m) by 4 ft (1.22 m) resistance boards attached to the downstream edge. The resistance board panels were anchored to the substrate rail by two hooks attached to a cable on the rail. The substrate rail was anchored to the stream bottom with metal stakes and duckbill anchors.

The resistance board panel section was bracketed by two fixed panel sections which consisted of five wooden tripods, composed of three beams, 4 in (10.16 cm) by 6 in (15.24 cm), and a small wooden platform approximately 2 ft (60.96 cm) below the intersection of the beams. These sections extend from the north bank to the beginning of the resistance-board weir (approximately 50 ft). On the left bank, two tripods were used. Sandbags were placed on the tripod platform to provide

stability against the current. Two 3 in (7.62 cm) diameter x 10 ft (3.05 m) aluminum pipes were positioned to span the distance between the front legs of adjacent tripods. Weir panels consisting of 15 aluminum pipes (pickets) 1 in (2.54 cm) in diameter, and measured 2 ft 6 in (0.76 m) wide by 6 ft 8 in (2.03 m) in length were then positioned to rest on the upstream surface of the aluminum pipe.

The fixed panel sections were attached to each bank by fixed-picket sections of fixed-picket panels 2-3 ft long, and extended from the bank to the fixed-panel weir on each side of the river. One tripod was used with two horizontal aluminum bars with holes placed across the tripod to allow individual pipes to be placed through. The aluminum bars were secured to shore and individual pipes (1 in diameter) were slid through the bar holes.

A passage chute was placed at approximately the middle of the resistance-board, floating section. To aid the species identification of salmon in turbid water, aluminum panels were placed on the substrate directly in front of the passage chute on the up-river side. A live trap box was placed adjacent to the south bank. A fixed picket section was modified to provide a passage gate that allowed fish to enter the live trap box.

Escapement Counts

Fish passage counts were made daily from 20:00 on June 25 through 18:00 on September 18. During passage counts, the passage chute gate was opened to pass fish through the weir. Crewmembers identified and enumerated the fish as they moved through. Passage counts occurred regularly throughout the day, typically for 1-2 hour periods, beginning in the morning and continuing as late as light permitted. Substantial delays in fish passage occurred only at night or during ASL sampling. In addition, fish carcasses washing up on the weir were enumerated and identified by species daily throughout the operation of the weir.

Chinook, sockeye, and chum salmon escapements in the Goodnews River were estimated by dividing their respective aerial survey counts by their respective weir indices. For each species, the weir index was the ratio of the number of fish observed above the weir during an aerial survey of the Middle Fork to the cumulative number of fish having passed the weir to that date. The resulting Goodnews River estimate was then adjusted to account for the estimated percentage of the run that reached the spawning ground after the survey was flown. This percentage was derived from the proportion of the respective runs that passed the weir after the survey was flown.

Age, Sex, and Length Sampling

Escapement sampling was conducted based on the pulse sampling design of Molyneaux and DuBois (1999). The sampling objective for chinook salmon escapement was 4-5 strata (pulses) of 210 fish each, distributed equally over the run. Objectives for sockeye and chum salmon were a minimum of 6 pulses of 210 and 200 fish each, respectively, distributed equally over their runs. The objective for coho salmon was 3 pulses of 170 fish each, distributed equally over the run. Each pulse sample was used to estimate the ASL composition of the run at a given point of time during the run. A weighted mean, based on relative fish passage during each defined pulse as the weight, was used to estimate age composition of the total season passage.

To obtain salmon for escapement ASL sampling, a gate on the live trap was opened for a period of time to allow a sufficient number fish to enter. The live trap gate was closed and individual salmon were removed from the trap using a dip net. To avoid any bias, all fish in the live box were sampled regardless if target samples sizes were exceeded. Escapement sampling occurred throughout the day to avoid targeting one group of fish. To sample salmon from the commercial harvest, fish were obtained from the processor in totes filled at the dock as fishermen made their deliveries. To avoid bias, all fish in a tote were sampled regardless if the target sample size was exceeded. Commercial harvest sampling occurred throughout the day to avoid targeting one group of fish. For both escapement and harvest ASL data collection, fish were measured for length (from the mid-eye to fork of tail). Escapement samples were sexed by examination of external characteristics. Commercial harvest samples were sexed by making a small incision (approx. 1 inch long) anterior to the anus, then checking for the presence of eggs in the body cavity. For escapement samples, three scales each from chinook, chum, and coho salmon were removed, and one scale from sockeye salmon was removed. For commercial harvest samples, three scales each from chinook and coho salmon were removed, and one scale each from chum and sockeye salmon were removed. For both escapement and commercial harvest sampling, scales were removed from the left side of the fish, approximately two rows above the lateral line in the area crossed by a diagonal from the posterior insertion of the dorsal fin to the anterior insertion of the anal fin (INPFC 1963, DuBois and Molyneaux 2001). After escapement sampling was complete, fish were released on the upriver side of the weir. After commercial harvest sampling, fish were returned to the buyer. Scales were arranged on gum cards in the field and sent to the Bethel office for processing. Impressions from the gum cards were made on cellulose acetate cards with a heated hydraulic press (Clutter and Whitesel 1956). Ages of the salmon were determined by examining the scale impressions (Mosher 1968) and recorded in European notation (Koo 1962).

Aerial Surveys

An aerial survey for chinook, sockeye, and chum salmon was flown over the Goodnews River and Middle Fork and associated lakes on August 1 and 2. The survey was flown in a Piper Super Cub at an altitude of approximately 500 ft.

Atmospheric and Hydrological Monitoring

Water level, determined from an established benchmark at a height of 150 cm, precipitation, air and water temperature, cloud cover, and cloud ceiling height were recorded daily at the weir site from June 7 through September 19.

RESULTS

Salmon Fisheries

The 2002 commercial harvest was 979 chinook, 6,304 sockeye, 3,799 chum salmon, and 3,041 coho salmon, for a total of 14,123 fish (Table 1). Individual species harvests were well below their respective most recent 10-year averages (Table 1). The total harvest was 65 % below the 2001 harvest and 82 % below the most recent 10-year average of 77,685 fish (Table 1). The total harvest in 2002 was the fourth lowest on record.

A total of 30 permits fished the district in 2002 (Table 1), 6 % less than the 32 permits that fished in 2001, and 61 % less than the most recent 10-year average of 77. The 12 periods in 2002 (Table 1) was 25 % less than the 16 periods in 2000, and 52 % less than the most recent 10-year average of 25 periods. There were 183 hrs of fishing time in 2002 (Table 1), a 21 % decrease from 2001, and 54 % below the most recent 10-year average of 315 hrs. The exvessel value of the 2002 District 5 commercial harvest was $24,802 (Table 1), 75 % less than the exvessel value of $98,849 in 2001, and 91 % less than the most recent 10-year average of $272,797.

At the time of this writing the subsistence and sport fish harvest information was not available for 2002. As a result, the exploitation of the salmon stocks is based only on the commercial harvest. The actual exploitation of the 2002 salmon runs will be reported in the 2003 report. Based on the commercial harvest only, the exploitation of chinook, sockeye, and chum salmon was 12 %, 10 %, and 3 %, respectively. The exploitation of coho salmon is not calculated as their escapement in the Goodnews River is not known.

Escapement

Escapement at the weir was 3,076 chinook, 22,019 sockeye, 30,233 chum, 27,364 coho, and 1,328 pink salmon (Table 2). An estimated 4% of the chinook and sockeye salmon, and 1% of the chum salmon escapements passed the weir site prior to operation. Chinook and sockeye salmon failed to achieve their escapement goals of 3,500 and 25,000 fish by 12 % each. The chum salmon escapement more than doubled their goal of 15,000. Daily and cumulative fish passage counts and carcass counts can be found in Tables 3 through 5.

Escapement estimates for the Goodnews River were 3,886 chinook, 29,549 sockeye, and 107,895 chum salmon (Table 2). These estimates were determined by expanding the aerial survey counts for the Goodnews River, 3,561 chinook, 29,340 sockeye, and 7,330 chum salmon, by their respective Middle Fork indices. The indices were 0.39, 0.12, and 0.03 for chinook, sockeye, and chum salmon, respectively. The estimates were adjusted to account for the percentages of the respective runs that reached the spawning grounds after the surveys were flown (derived from the weir passage data). These percentages were 3%, 2%, and 5% for chinook, sockeye, and chum salmon, respectively. Estimated drainage wide escapements were 7,172 chinook, 52,603 sockeye, and 140,120 chum salmon.

Chinook and sockeye salmon run timing appeared normal (Figs 3 and 4) compared to historical run timing information. Chum salmon run timing appeared early compared to historical run

timing information (Fig 5). As this was the sixth year of complete coho salmon escapement counts, run timing models have not been developed. Run timing for all six years are presented for comparison (Fig 6).

Age, Sex, and Length

A complete summary of escapement and commercial harvest ASL data from 2002 for chinook, sockeye, and chum salmon can be found in Tables 6 through 23.

Chinook: The relative abundances of age 1.2, 1.3, and 1.4 fish in the weir escapement were within the usual ranges. In the commercial harvest, the 38.2 % age 1.2 fish was nearly 15 % greater than the overall 23.5 %, while the 31.4 % of age 1.3 fish was nearly 13 % less than the overall 44.1 %. For both the escapement and commercial harvests, the distributions of lengths within the age classes were within the usual ranges. Obtaining chinook salmon samples for ASL determination from both the weir escapement and the District W-5 commercial harvest is problematic. As a result, sample sizes are typically inadequate. Caution is needed when using these incomplete data sets to characterize chinook salmon runs into the Goodnews River drainage.

Sockeye: The 27.6 % and 51.6 % of age 1.3 fish in the escapement and commercial harvest, respectively, were well below average. For both the escapement and commercial harvests, the relative distributions of lengths within the age classes were within the usual ranges.

Chum: The 37.1 % age 0.3 fish in the weir escapement was well below the seasonal average of 62.3 %, while the 58.6 % age 0.4 fish was well above the seasonal average of 36.4 %.
The relative abundances of age 0.2, 0.3, 0.4, and 0.5 chum salmon harvested in the 2002 District W-5 commercial fishery were within the usual ranges. For both the escapement and commercial harvests, the relative distributions of lengths within the age classes were within the usual ranges.

Coho: Analysis of the ASL information collected from the coho salmon escapement at the weir and the District W-5 commercial harvest was not yet complete at the time of this writing. Analysis of this information will be included in the 2003 report.

Aerial Surveys

Conditions for the chinook and sockeye salmon surveys were classified as fair to good. The conditions for the chum salmon survey were classified as poor as it was difficult to contrast the fish from the river substrate. An aerial survey was not flown for coho salmon because of poor weather and aircraft availability.

The Middle Fork aerial survey results were 1,195 chinook, 2,626 sockeye, and 1,208 chum salmon (Table 2). Chinook, sockeye, and chum salmon failed to achieve their aerial survey escapement goals. The Goodnews River aerial survey results were 1,470 chinook, 3,475 sockeye, and 3,075 chum salmon (Table 2). Only chinook salmon achieved their aerial escapement goal.

Atmospheric and Hydrological Monitoring

A complete listing of daily environmental conditions can be found in Table 24.

DISCUSSION/RECOMMENDATIONS

The project saw the complete achievement of its annual objectives in 2002. The project continues to add information to the long-term escapement, run timing, and ASL database for salmon at the weir. The project also serves as a platform for the study of other anadromous and resident freshwater species.

ADF&G, Commercial Fisheries Division, provides funding for the operation of the weir from mid-June through mid-August. The Federal Office of Subsistence Management (FOSM) has provided funding to extend the operation of the weir through the coho salmon migration (mid-August through the end of September) since 2000. FOSM will provide funding again in 2003, however, it is unclear if FOSM will provide funding in following years. Further funding is necessary to continue monitoring the escapement of the coho salmon in the Middle Fork. This information is critical to the long-term monitoring and sustained yield management of this stock. The long-term collection of this information should lead to the eventual establishment of a SEG for coho salmon at the weir. The extended operation of the weir provides an index for estimating coho salmon abundances in the Goodnews River from aerial survey. Also, extending the operation of the weir allows for the study of the other anadromous species and resident freshwater fish such as Dolly Varden, whitefish, and rainbow trout. The department is currently seeking long term funding beyond 2003.

The District W-5 commercial fishery has been in a steady decline since 1997. The decline has been the most pronounced during the past four years. In 1999, 2001, and 2002, the total commercial harvests were well below the historic and most recent 10-year averages. The total harvest in 2002 was the lowest since 1972, and the fourth lowest on record. Likewise, the number of permits fishing the district the last two years have been among the lowest on record. The below average commercial harvests is likely attributable to a combination of the below average number of permits fishing the district, the below average escapement of sockeye salmon at the weir in 2001 and 2002. In 2001 and 2002, fishing time was substantially reduced during the sockeye salmon directed fishery to increase their escapement at the weir (despite near record catch per unit efforts for sockeye salmon and their well above average escapement in the Goodnews River in 2001), and because the single registered buyer was often unable to provide a tender to the district during openings. The decrease in the number of permits fishing the district is likely attributable to the poor market value of salmon, increasing fuel prices, and other economic opportunity in the area.

Sockeye salmon failed to achieve their escapement goal at the weir for the second consecutive year. Sockeye salmon escapements in both the Middle Fork and Goodnews Rivers were well below their respective averages. This is in contrast to 2001 when although sockeye salmon failed to achieve their escapement goal at the weir, their escapement in the Goodnews River was the fifth largest on record. The below average run in 2002 could be the result of the low number of age 1.3 fish that returned. Typically, the sockeye salmon escapement at the weir, and those harvested in the District W-5 commercial fishery, are comprised mostly of age 1.3 fish. In 2002,

the percentage of age 1.3 fish in the escapement and commercial harvest were well below average. The parent year of age 1.3 fish was 1997. In that year, sockeye salmon exceed their escapement goal at the weir, however, their escapement in the Goodnews River was well below average. Also, unseasonably dry weather in 1997 resulted in low water levels in the upper reaches of the Middle Fork and Goodnews Rivers. During an aerial survey conducted on August 6, 1997, numerous stretches of dry riverbed and lakes were observed, with sockeye salmon carcasses present (Jim Menard, personal communication). Schools of sockeye salmon trapped between dry stretches of the river were also observed (Jim Menard personal communication). Low water could have impeded the migration of sockeye salmon to their spawning grounds. This combined with the below average escapement in the Goodnews River could explain the below average number of age 1.3 fish in the 2002 sockeye salmon run.

Obtaining adequate sample sizes from chinook salmon for ASL determination continues to be problematic. It has been observed that chinook salmon are hesitant to enter the live trap when numerous sockeye and chum salmon are present (Rob Stewart, ADF&G, personal communication). A potential solution is to place a second live trap box further out from the bank, which could provide an alternate trap for the chinook salmon to enter (assuming sockeye and chum salmon continue to primarily enter the live trap box nearest to the shore). The department will attempt to procure funding for an additional live box in 2004.

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Table 1. Summary of the commercial harvest, number of permits fished, fishing time, and exvessel value for District 5, and the Goodnews Bay area subsistence harvest, 2002.

Commercial Harvest

	Chinook	Sockeye	Chum	Coho	Total
2002	979	6,304	3,799	3,041	14,123
10-year avg (92-01)	2,608	38,047	13,689	20,061	77,685
historical avg	3,905	23,509	11,906	20,580	61,928

Effort

	Permits Fished	Hours	Openings
2002	30	144	12
10-year avg (92-01)	77	315	25
historical avg	62	350	26

Exvessel Value

	Chinook	Sockeye	Chum	Coho	Total
2002	$4,244	$15,846	$2,979	$5,635	$24,802
10-year avg (92-01)	$18,074	$161,395	$17,657	$74,815	$272,797

Subsistence Harvest

	Chinook	Sockeye	Chum	Coho
2002	na	na	na	na
10-year avg (92-01)	633	729	303	540

Table 2. Summary of salmon escapement and aerial survey counts for the Goodnews River drainage, 2002.

Middle Fork Goodnews

Escapement

	Chinook	Sockeye	Chum	Coho
2002	3,076	22,019	30,233	27,364
Escapement Goal	3,500	25,000	15,000	none
10-year avg (92-01)	3,532	40,312	25,326	na
Historical Avg.	3,195	37,456	20,151	18,980a

Aerial Survey

	Chinook	Sockeye	Chum	Coho
2002	1,195	2,626	1,208	na
Escapement Goal	1,600	5,000	4,000	2,000

Goodnews River

Estimated Escapement

	Chinook	Sockeye	Chum
2002	4,096	31,476	110,215
10-year Avg. (92-01)	6,245	77,268	53,198
Historical Avg.	6,247	72,144	51,005

Aerial Survey

	Chinook	Sockeye	Chum	Coho
2002 results	1,470	3,475	3,075	na
Escapement Goal	800	5,000	4,000	20,000

Goodnews drainage

Run Size

	Chinook	Sockeye	Chum
2002	8,151[a]	59,799[a]	144,247[a]
10-year avg (92-01)	13,197	156,586	78,523
historical avg	14,608	144,985	82,877

Exploitation (%)

	Chinook	Sockeye	Chum
2002	12[a]	10[a]	3[a]
10-year avg (92-01)	24	22	13

[a] Subsistence and sport harvests not included

Table 3. Daily and cumulative salmon passage, Middle Fork Goodnews River weir, 2002.

	Chinook		Sockeye		Chum		Pink		Coho	
Date	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum
25-Jun	9	9	82	82	68	68	-	-	-	-
26-Jun	36	45	609	691	212	280	-	-	-	-
27-Jun	35	80	431	1,122	90	370	3	3	-	-
28-Jun	68	148	681	1,803	168	538	4	7	-	-
29-Jun	102	250	745	2,548	639	1,177	13	20	-	-
30-Jun	254	504	1,020	3,568	1,040	2,217	26	46	-	-
1-Jul	97	601	960	4,528	1,262	3,479	63	109	-	-
2-Jul	58	659	693	5,221	560	4,039	8	117	-	-
3-Jul	215	874	1,397	6,618	1,337	5,376	34	151	-	-
4-Jul	73	947	1,305	7,923	945	6,321	20	171	-	-
5-Jul	37	984	669	8,592	517	6,838	10	181	-	-
6-Jul	76	1,060	1,579	10,171	784	7,622	8	189	-	-
7-Jul	24	1,084	1,202	11,373	1,271	8,893	22	211	-	-
8-Jul	91	1,175	802	12,175	256	9,149	24	235	-	-
9-Jul	194	1,369	1,103	13,278	591	9,740	30	265	-	-
10-Jul	133	1,502	919	14,197	1,241	10,981	24	289	-	-
11-Jul	129	1,631	575	14,772	1,713	12,694	36	325	-	-
12-Jul	50	1,681	358	15,130	713	13,407	11	336	-	-
13-Jul	23	1,704	440	15,570	421	13,828	17	353	-	-
14-Jul	228	1,932	891	16,461	876	14,704	29	382	-	-
15-Jul	93	2,025	511	16,972	1,490	16,194	19	401	-	-
16-Jul	149	2,174	496	17,468	1,292	17,486	17	418	-	-
17-Jul	105	2,279	462	17,930	1,244	18,730	28	446	-	-
18-Jul	134	2,413	352	18,282	2,444	21,174	69	515	-	-
19-Jul	70	2,483	139	18,421	1,067	22,241	41	556	-	-
20-Jul	16	2,499	334	18,755	255	22,496	34	590	-	-
21-Jul	78	2,577	392	19,147	303	22,799	26	616	-	-
22-Jul	86	2,663	274	19,421	1,024	23,823	29	645	-	-
23-Jul	48	2,711	240	19,661	995	24,818	52	697	-	-
24-Jul	39	2,750	179	19,840	530	25,348	64	761	-	-
25-Jul	21	2,771	208	20,048	329	25,677	41	802	-	-
26-Jul	51	2,822	187	20,235	657	26,334	88	890	-	-
27-Jul	6	2,828	55	20,290	392	26,726	38	928	7	7
28-Jul	24	2,852	137	20,427	508	27,234	66	994	6	13
29-Jul	19	2,871	83	20,510	374	27,608	59	1,053	4	17
30-Jul	8	2,879	133	20,643	251	27,859	48	1,101	8	25
31-Jul	29	2,908	93	20,736	466	28,325	121	1,222	12	37
1-Aug	-	2,908	-	20,736	76	28,401	-	1,222	1	38
2-Aug	13	2,921	62	20,798	350	28,751	180	1,402	41	79
3-Aug	5	2,926	28	20,826	204	28,955	140	1,542	32	111
4-Aug	6	2,932	20	20,846	169	29,124	124	1,666	9	120

-Continued-

Table 3 continued (page 2 of 2)

	Chinook		Sockeye		Chum		Pink		Coho	
Date	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum
5-Aug	6	2,938	32	20,878	90	29,214	74	1,740	16	136
6-Aug	2	2,940	12	20,890	68	29,282	12	1,752	4	140
7-Aug	5	2,945	44	20,934	113	29,395	24	1,776	35	175
8-Aug	2	2,947	23	20,957	117	29,512	31	1,807	26	201
9-Aug	2	2,949	11	20,968	52	29,564	54	1,861	63	264
10-Aug	-	2,949	2	20,970	31	29,595	10	1,871	2	266
11-Aug	5	2,954	7	20,977	49	29,644	51	1,922	52	318
12-Aug	4	2,958	7	20,984	37	29,681	71	1,993	135	453
13-Aug	5	2,963	14	20,998	29	29,710	68	2,061	170	623
14-Aug	2	2,965	3	21,001	6	29,716	10	2,071	20	643
15-Aug	1	2,966	15	21,016	18	29,734	72	2,143	133	776
16-Aug	6	2,972	8	21,024	36	29,770	96	2,239	157	933
17-Aug	-	2,972	-	21,024	7	29,777	13	2,252	30	963
18-Aug	6	2,978	3	21,027	27	29,804	100	2,352	411	1,374
19-Aug	2	2,980	-	21,027	5	29,809	47	2,399	911	2,285
20-Aug	-	2,980	6	21,033	18	29,827	6	2,405	37	2,322
21-Aug	7	2,987	9	21,042	21	29,848	79	2,484	676	2,998
22-Aug	5	2,992	5	21,047	11	29,859	97	2,581	399	3,397
23-Aug	-	2,992	1	21,048	4	29,863	21	2,602	61	3,458
24-Aug	1	2,993	3	21,051	2	29,865	16	2,618	87	3,545
25-Aug	-	2,993	2	21,053	6	29,871	54	2,672	525	4,070
26-Aug	-	2,993	2	21,055	-	29,871	20	2,692	516	4,586
27-Aug	1	2,994	3	21,058	2	29,873	77	2,769	2,810	7,396
28-Aug	2	2,996	-	21,058	4	29,877	34	2,803	1,771	9,167
29-Aug	1	2,997	2	21,060	-	29,877	7	2,810	78	9,245
30-Aug	1	2,998	-	21,060	3	29,880	11	2,821	161	9,406
31-Aug	1	2,999	3	21,063	2	29,882	25	2,846	1,177	10,583
1-Sep	-	2,999	3	21,066	-	29,882	20	2,866	1,001	11,584
2-Sep	-	2,999	4	21,070	3	29,885	15	2,881	653	12,237
3-Sep	-	2,999	3	21,073	4	29,889	33	2,914	2,563	14,800
4-Sep	-	2,999	2	21,075	1	29,890	26	2,940	786	15,586
5-Sep	-	2,999	6	21,081	-	29,890	33	2,973	2,025	17,611
6-Sep	-	2,999	4	21,085	1	29,891	5	2,978	2,540	20,151
7-Sep	1	3,000	8	21,093	-	29,891	1	2,979	2,334	22,485
8-Sep	-	3,000	7	21,100	-	29,891	10	2,989	615	23,100
9-Sep	-	3,000	2	21,102	1	29,892	1	2,990	53	23,153
10-Sep	-	3,000	2	21,104	-	29,892	2	2,992	117	23,270
11-Sep	-	3,000	5	21,109	1	29,893	3	2,995	190	23,460
12-Sep	1	3,001	7	21,116	7	29,900	26	3,021	2,555	26,015
13-Sep	-	3,001	7	21,123	3	29,903	5	3,026	695	26,710
14-Sep	-	3,001	2	21,125	-	29,903	3	3,029	275	26,985
15-Sep	-	3,001	2	21,127	2	29,905	3	3,032	181	27,166
16-Sep	-	3,001	2	21,129	-	29,905	2	3,034	124	27,290
17-Sep	-	3,001	-	21,129	-	29,905	-	3,034	47	27,337
18-Sep	-	3,001	-	21,129	-	29,905	-	3,034	27	27,364

Table 4. Daily and cumulative passage non salmon species, Middle Fork Goodnews River weir, 2002.

	Dolly Varden		Whitefish		Rainbow	
Date	Daily	Cumulative	Daily	Cumulative	Daily	Cumulative
25-Jun	4	4	18	18	-	-
26-Jun	-	4	4	22	1	1
27-Jun	1	5	-	22	-	1
28-Jun	2	7	-	22	-	1
29-Jun	1	8	6	28	-	1
30-Jun	1	9	18	46	-	1
1-Jul	2	11	41	87	-	1
2-Jul	7	18	24	111	-	1
3-Jul	7	25	14	125	-	1
4-Jul	7	32	7	132	2	3
5-Jul	-	32	5	137	-	3
6-Jul	8	40	7	144	-	3
7-Jul	25	65	5	149	-	3
8-Jul	26	91	3	152	-	3
9-Jul	63	154	6	158	-	3
10-Jul	100	254	2	160	-	3
11-Jul	239	493	7	167	-	3
12-Jul	112	605	8	175	-	3
13-Jul	278	883	16	191	-	3
14-Jul	261	1,144	16	207	-	3
15-Jul	74	1,218	5	212	-	3
16-Jul	125	1,343	-	212	-	3
17-Jul	132	1,475	13	225	-	3
18-Jul	102	1,577	13	238	-	3
19-Jul	24	1,601	2	240	-	3
20-Jul	25	1,626	4	244	-	3
21-Jul	22	1,648	7	251	-	3
22-Jul	28	1,676	6	257	-	3
23-Jul	12	1,688	8	265	-	3
24-Jul	8	1,696	8	273	-	3
25-Jul	3	1,699	3	276	-	3
26-Jul	4	1,703	8	284	-	3
27-Jul	-	1,703	-	284	-	3
28-Jul	2	1,705	-	284	-	3
29-Jul	5	1,710	-	284	-	3
30-Jul	1	1,711	6	290	-	3
31-Jul	9	1,720	12	302	-	3
1-Aug	-	1,720	-	302	-	3
2-Aug	5	1,725	9	311	-	3
3-Aug	9	1,734	17	328	-	3
4-Aug	2	1,736	2	330	-	3

-Continued-

Table 4 continued (page 2 of 2)

	Dolly Varden		Whitefish		Rainbow	
Date	Daily	Cumulative	Daily	Cumulative	Daily	Cumulative
5-Aug	2	1,738	5	335	-	3
6-Aug	-	1,738	3	338	-	3
7-Aug	-	1,738	-	338	-	3
8-Aug	-	1,738	1	339	-	3
9-Aug	2	1,740	4	343	-	3
10-Aug	1	1,741	1	344	-	3
11-Aug	-	1,741	2	346	-	3
12-Aug	1	1,742	5	351	-	3
13-Aug	-	1,742	1	352	-	3
14-Aug	1	1,743	1	353	-	3
15-Aug	1	1,744	-	353	-	3
16-Aug	-	1,744	3	356	-	3
17-Aug	-	1,744	-	356	-	3
18-Aug	3	1,747	-	356	-	3
19-Aug	-	1,747	-	356	-	3
20-Aug	-	1,747	-	356	-	3
21-Aug	-	1,747	1	357	-	3
22-Aug	-	1,747	-	357	-	3
23-Aug	1	1,748	-	357	-	3
24-Aug	-	1,748	1	358	-	3
25-Aug	1	1,749	16	374	-	3
26-Aug	1	1,750	1	375	-	3
27-Aug	-	1,750	5	380	-	3
28-Aug	-	1,750	7	387	-	3
29-Aug	-	1,750	4	391	-	3
30-Aug	-	1,750	1	392	-	3
31-Aug	-	1,750	4	396	-	3
1-Sep	-	1,750	5	401	-	3
2-Sep	1	1,751	4	405	-	3
3-Sep	-	1,751	2	407	-	3
4-Sep	1	1,752	4	411	-	3
5-Sep	1	1,753	3	414	-	3
6-Sep	5	1,758	5	419	-	3
7-Sep	3	1,761	4	423	-	3
8-Sep	6	1,767	3	426	-	3
9-Sep	-	1,767	2	428	-	3
10-Sep	1	1,768	1	429	-	3
11-Sep	-	1,768	-	429	-	3
12-Sep	2	1,770	-	429	-	3
13-Sep	-	1,770	-	429	-	3
14-Sep	-	1,770	-	429	-	3
15-Sep	-	1,770	-	429	-	3
16-Sep	-	1,770	-	429	-	3
17-Sep	-	1,770	-	429	-	3
18-Sep	-	1,770	1	430	-	3

Table 5. Daily and cumulative salmon carcass count, Middle Fork Goodnews River weir, 2002.

	Chinook		Sockeye		Chum		Pink		Coho	
Date	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum
22-Jun										
23-Jun										
24-Jun										
25-Jun										
26-Jun										
27-Jun		-	5	5	2	2		-		-
28-Jun		-		5		2		-		-
29-Jun		-	5	10	2	4		-		-
30-Jun		-	4	14	1	5	1	1		-
1-Jul	1	1	5	19	7	12		1		-
2-Jul	1	2	5	24	10	22		1		-
3-Jul		2	8	32	12	34		1		-
4-Jul		2	6	38	17	51		1		-
5-Jul		2	9	47	12	63	1	2		-
6-Jul		2	8	55	25	88	1	3		-
7-Jul		2	6	61	20	108		3		-
8-Jul	1	3	2	63	34	142		3		-
9-Jul		3	2	65	40	182		3		-
10-Jul	1	4	2	67	35	217	1	4		-
11-Jul	1	5	1	68	65	282		4		-
12-Jul	1	6	1	69	30	312		4		-
13-Jul	2	8	1	70	48	360	3	7		-
14-Jul	1	9		70	33	393		7		-
15-Jul		9	5	75	80	473		7		-
16-Jul	5	14	3	78	76	549	2	9		-
17-Jul	2	16		78	68	617		9		-
18-Jul	1	17	2	80	111	728		9		-
19-Jul		17	6	86	113	841	3	12		-
20-Jul		17	7	93	106	947	4	16		-
21-Jul	2	19	2	95	72	1,019		16		-
22-Jul	2	21	4	99	50	1,069	6	22		-
23-Jul	4	25	7	106	213	1,282	8	30		-
24-Jul	2	27	8	114	141	1,423	5	35		-
25-Jul	9	36	16	130	209	1,632	14	49		-
26-Jul	5	41	3	133	284	1,916	18	67		-
27-Jul	6	47	5	138	257	2,173	13	80		-
28-Jul	2	49	5	143	322	2,495	7	87		-
29-Jul	10	59	10	153	449	2,944	10	97		-
30-Jul	6	65	8	161	195	3,139	4	101		-
31-Jul	7	72	8	169	339	3,478	19	120		-
1-Aug	6	78	3	172	142	3,620	4	124		-
2-Aug	19	97	6	178	315	3,935	13	137		-
3-Aug	15	112	5	183	465	4,400	21	158		-

-Continued-

Table 5 continued (page 2 of 2)

	Chinook		Sockeye		Chum		Pink		Coho	
Date	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum
4-Aug	13	125	15	198	287	4,687	25	183		-
5-Aug	23	148	4	202	243	4,930	28	211		-
6-Aug	15	163	8	210	173	5,103	11	222		-
7-Aug	22	185	6	216	193	5,296	12	234		-
8-Aug	17	202	11	227	139	5,435	13	247		-
9-Aug	22	224	7	234	105	5,540	13	260		-
10-Aug	11	235	4	238	118	5,658	5	265		-
11-Aug	12	247	9	247	92	5,750	11	276		-
12-Aug	13	260	5	252	129	5,879	12	288		-
13-Aug	11	271	6	258	63	5,942	10	298		-
14-Aug	3	274	3	261	48	5,990		298		-
15-Aug	3	277	8	269	37	6,027	3	301		-
16-Aug	6	283	11	280	59	6,086	11	312		-
17-Aug	2	285	2	282	26	6,112	14	326		-
18-Aug	2	287	3	285	31	6,143	19	345		-
19-Aug	4	291	6	291	22	6,165	9	354		-
20-Aug		291	6	297	18	6,183	6	360		-
21-Aug	4	295	12	309	28	6,211	25	385		-
22-Aug	4	299	5	314	20	6,231	16	401	1	1
23-Aug	5	304	9	323	11	6,242	13	414	1	2
24-Aug	1	305	6	329	7	6,249	29	443		2
25-Aug	1	306	2	331	7	6,256	15	458		2
26-Aug	3	309	6	337	16	6,272	16	474		2
27-Aug		309	2	339	5	6,277	22	496		2
28-Aug		309	4	343	8	6,285	22	518	1	3
29-Aug	1	310	2	345	3	6,288	31	549		3
30-Aug	1	311	7	352	2	6,290	19	568		3
31-Aug	2	313	2	354	2	6,292	26	594	2	5
1-Sep		313	2	356		6,292	18	612		5
2-Sep		313	5	361	3	6,295	30	642		5
3-Sep		313		361	1	6,296	8	650		5
4-Sep		313	2	363	2	6,298	11	661		5
5-Sep		313	4	367	4	6,302	13	674	2	7
6-Sep		313	3	370	1	6,303	11	685	3	10
7-Sep	2	315		370		6,303	25	710		10
8-Sep		315	5	375	1	6,304	18	728	1	11
9-Sep		315		375		6,304	5	733	2	13
10-Sep		315	5	380	1	6,305	12	745	4	17
11-Sep		315	3	383		6,305	8	753	2	19
12-Sep		315	5	388		6,305	13	766	8	27
13-Sep		315	2	390		6,305	7	773	5	32
14-Sep		315		390		6,305	2	775	3	35
15-Sep		315		390		6,305	1	776		35

Table 6. The age and sex composition of the chinook salmon escapement at the Middle Fork Goodnews River weir, 2002.

Sample Dates (Stratum Dates)	Sample Size	Sex	Age Class 1.1 Catch	1.1 %	1.2 Catch	1.2 %	1.3 Catch	1.3 %	1.4 Catch	1.4 %	1.5 Catch	1.5 %	Total Catch	Total %
6/30 - 7/3	49	M	0	0.0	400	38.8	210	20.4	147	14.3	0	0.0	757	73.5
(6/22 – 7/4)		F	0	0.0	0	0.0	21	2.0	232	22.4	21	2.0	274	26.5
		Total	0	0.0	400	38.8	231	22.4	379	36.7	21	2.0	1,031	100.0
7/5, 7 – 9, 11, 13	76	M	0	0.0	316	29.3	259	24.0	187	17.4	0	0.0	766	71.1
(7/17,20-23,27-28)		F	0	0.0	0	0.0	0	0.0	273	25.3	43	4.0	312	28.9
		Subtotal	0	0.0	316	29.3	259	24.0	460	42.7	43	4.0	1,078	100.0
7/17,20-23,27-28	74	M	0	0.0	241	24.7	214	21.9	94	9.6	13	1.3	567	58.1
(7/16-9/18)		F	0	0.0	0	0.0	27	2.8	334	34.2	53	5.5	409	41.9
		Subtotal	0	0.0	241	24.7	241	24.7	428	43.8	66	6.8	976	100.0
Season	199	M	0	0.0	957	31.0	683	22.1	428	13.9	13	0.4	2,091	67.8
		F	0	0.0	0	0.0	48	1.6	839	27.2	118	3.8	994	32.2
		Total	0	0.0	957	31.0	731	23.7	1,267	41.1	131	4.2	3,085	100.0

Table 7. The mean length of the chinook salmon escapement at the Middle Fork Goodnews River weir, 2002.

Sample Dates (Stratum Dates)	Sex		Age Class 1.2	1.3	1.4	1.5
6/30 - 7/3 (6/22 – 7/4)	M	Mean Length (mm)	546	640	756	
		Std. Error	11	14	33	
		Range	470-640	567-707	605-869	
		Sample Size	19	10	7	0
	F	Mean Length (mm)		953	825	786
		Std. Error		-	18	-
		Range		953-953	727-920	786-786
		Sample Size	0	1	11	1
7/5, 7 – 9, 11, 13 (7/17,20-23,27-28)	M	Mean Length (mm)	535	666	845	
		Std. Error	11	10	22	
		Range	435-655	595-755	725-965	
		Sample Size	22	18	13	0
	F	Mean Length (mm)			855	883
		Std. Error			11	33
		Range			775-950	833-945
		Sample Size	0	0	19	3
7/17,20-23,27-28 (7/16-9/18)	M	Mean Length (mm)	533	673	859	700
		Std. Error	14	17	54	-
		Range	430-670	550-775	625-1020	700-700
		Sample Size	18	16	7	1
	F	Mean Length (mm)		779	890	906
		Std. Error		84	17	37
		Range		695-863	765-1070	800-957
		Sample Size	0	2	25	4
Season	M	Mean Length (mm)	539	660	818	700
		Range	430-670	550-775	605-1020	700-700
		Sample Size	59	44	27	1
	F	Mean Length (mm)		856	861	876
		Range		695-953	727-1070	786-957
		Sample Size	0	3	55	8

Table 8. The age and sex composition of chinook salmon from District W-5 based on commercial harvest sampling, 2002.

Sample Dates (Stratum Dates)	Sample Size	Sex	Age Class 1.1 Catch	1.1 %	1.2 Catch	1.2 %	1.3 Catch	1.3 %	1.4 Catch	1.4 %	1.5 Catch	1.5 %	Total Catch	Total %
6/27	75	M	8	1.3	280	48.0	156	26.7	54	9.3	0	0.0	498	85.3
(6/27)		F	0	0.0	0	0.0	31	5.3	47	8.0	8	1.3	86	14.7
		Subtotal	8	1.3	280	48.0	187	32.0	101	17.3	8	1.3	584	100.0
7/5	54	M	0	0.0	60	24.1	42	16.7	51	20.4	5	1.9	158	63.0
(7/1, 5)		F	0	0.0	0	0.0	4	1.8	88	35.2	0	0.0	93	37.0
		Subtotal	0	0.0	60	24.1	46	18.5	139	55.6	5	1.9	251	100.0
7/10	35	M	0	0.0	33	22.9	66	45.7	8	5.7	0	0.0	107	74.3
(7/10, 12, 8/1, 7,		F	0	0.0	0	0.0	8	5.7	25	17.2	4	2.9	37	25.7
10, 15, 17, 20)		Subtotal	0	0.0	33	22.9	74	51.4	33	22.9	4	2.9	144	100.0
Season	164	M	0	0.8	374	38.2	263	26.9	114	11.6	5	0.5	763	78.0
		F	0	0.0	0	0.0	44	4.5	160	16.3	12	1.2	216	22.0
		Total	0	0.8	374	38.2	307	31.4	274	27.9	17	1.7	979	100.0

Table 9. The mean length of chinook salmon harvested in District W-5, 2002.

Sample Dates (Stratum Dates)	Sex		Age Class 1.1	1.2	1.3	1.4	1.5
6/27 (6/27)	M	Mean Length (mm)	445	549	671	830	
		Std. Error	-	6	13	31	
		Range	445-445	474-605	562-808	682-936	
		Sample Size	1	36	20	7	0
	F	Mean Length (mm)			740	860	820
		Std. Error			26	11	-
		Range			667-778	825-905	820-820
		Sample Size	0	0	4	6	1
7/5 (7/1, 5)	M	Mean Length (mm)		539	674	787	900
		Std. Error		9	29	23	-
		Range		469-586	589-871	664-920	900-900
		Sample Size	0	13	9	11	1
	F	Mean Length (mm)			843	837	
		Std. Error			-	8	
		Range			843-843	778-885	
		Sample Size	0	0	1	19	0
7/10 (7/10, 12, 8/1, 7, 10, 15, 17, 20)	M	Mean Length (mm)		518	659	909	
		Std. Error		26	18	15	
		Range		435-649	522-758	894-924	
		Sample Size	0	8	16	2	0
	F	Mean Length (mm)			705	814	821
		Std. Error			25	16	-
		Range			680-730	774-870	821-821
		Sample Size	0	0	2	6	1
Season	M	Mean Length (mm)	445	544	668	817	900
		Range	445-445	435-649	522-871	664-936	900-900
		Sample Size	1	57	45	20	1
	F	Mean Length (mm)			744	840	820
		Range			667-843	774-905	820-821
		Sample Size	0	0	7	31	2

Table 10. The age and sex composition of the sockeye salmon escapement at the Middle Fork Goodnews River weir, 2002.

Sample Dates (Stratum Dates)	Sample Size	Sex	Age Class 0.3 Esc.	0.3 %	1.2 Esc.	1.2 %	1.3 Esc.	1.3 %	2.2 Esc.	2.2 %	1.4 Esc.	1.4 %	2.3 Esc.	2.3 %	Total Esc.	Total %
6/30, 7/1-3	176	M	54	0.6	2,283	23.9	1,522	15.9	652	6.8	217	2.3	544	5.7	5,327	55.7
(6/22-7/5)		F	0	0.0	1,848	19.3	1,848	19.3	218	2.3	109	1.1	163	1.7	4,239	44.3
		Subtotal	54	0.6	4,131	43.2	3,370	35.2	870	9.1	326	3.4	707	7.4	9,566	100.0
7/8-9,11,13	146	M	0	0.0	1,607	19.2	976	11.6	172	2.1	172	2.1	230	2.7	3,157	37.7
(7/6-15)		F	0	0.0	3,559	42.4	918	11.0	689	8.2	0	0.0	57	0.7	5,223	62.3
		Subtotal	0	0.0	5,166	61.6	1,894	22.6	861	10.3	172	2.1	287	3.4	8,380	100.0
7/17-30	163	M	26	0.6	637	15.4	408	9.8	102	2.5	0	0.0	102	2.5	1,300	31.3
(7/16-9/18)		F	25	0.6	2,116	50.9	433	10.4	102	2.4	76	1.8	102	2.4	2,855	68.7
		Subtotal	51	1.2	2,753	66.3	841	20.2	204	4.9	76	1.8	204	4.9	4,155	100.0
Season	485	M	80	0.4	4,527	20.5	2,905	13.1	927	4.2	390	1.8	875	4.0	9,783	44.3
		F	25	0.1	7,523	34.0	3,200	14.5	1,008	4.6	185	0.8	322	1.4	12,318	55.7
		Total	105	0.5	12,050	54.5	6,105	27.6	1,935	8.8	575	2.6	1,197	5.4	22,101	100.0

Table 11. The mean length of the sockeye salmon escapement at the Middle Fork Goodnews River weir, 2002.

Sample Dates			Age Class					
(Stratum Dates)	Sex		0.3	1.2	1.3	2.2	1.4	2.3
6/30, 7/1-3	M	Mean Length (mm)	584	518	567	538	567	554
(6/22-7/5)		Std. Error	-	5	7	13	29	10
		Range	584-584	457-620	485-610	486-619	505-627	498-592
		Sample Size	1	42	28	12	4	10
	F	Mean Length (mm)		493	543	503	550	546
		Std. Error		5	6	39	4	23
		Range		451-597	445-619	405-590	546-554	520-591
		Sample Size	0	34	34	4	2	3
7/8-9,11,13	M	Mean Length (mm)		509	560	497	610	526
(7/6-15)		Std. Error		5	8	7	12	13
		Range		445-565	510-610	485-510	590-630	505-565
		Sample Size	0	28	17	3	3	4
	F	Mean Length (mm)		489	523	484		465
		Std. Error		2	8	7		-
		Range		440-530	450-575	425-515		465-465
		Sample Size	0	62	16	12	0	1
7/17-30	M	Mean Length (mm)	585	509	599	513		571
(7/16-9/18)		Std. Error	-	8	12	12		11
		Range	585-585	425-585	500-666	480-535		545-600
		Sample Size	1	25	16	4	0	4
	F	Mean Length (mm)	565	496	557	486	582	524
		Std. Error	-	3	9	12	14	22
		Range	565-565	429-564	470-634	465-520	555-600	460-560
		Sample Size	1	83	17	4	3	4
Season	M	Mean Length (mm)	584	514	569	528	586	549
		Range	584-585	425-620	485-666	480-619	505-630	498-600
		Sample Size	2	95	61	19	7	18
	F	Mean Length (mm)	565	492	539	488	563	525
		Range	565-565	429-597	445-634	405-590	546-600	460-591
		Sample Size	1	179	67	20	5	8

Table 12. The age and sex composition of sockeye salmon harvested in District 5, 2002.

Sample Dates (Stratum Dates)	Sample Size	Sex	Age Class 0.3 Catch	0.3 %	1.2 Catch	1.2 %	1.3 Catch	1.3 %	1.4 Catch	1.4 %	2.3 Catch	2.3 %	Total Catch	Total %
6/27	195	M	16	0.5	276	8.7	974	30.7	260	8.2	211	6.7	1,868	59.0
(6/27, 7/1, 5)		F	65	2.1	98	3.1	861	27.2	114	3.6	114	3.6	1,299	41.0
		Subtotal	81	2.6	374	11.8	1,835	57.9	374	11.8	325	10.3	3,167	100.0
7/10	180	M	39	1.7	401	17.2	439	18.9	78	3.3	155	6.7	1,228	52.8
(7/10, 12)		F	39	1.6	323	13.9	491	21.1	90	3.9	103	4.4	1,098	47.2
		Subtotal	78	3.3	724	31.1	930	40.0	168	7.2	258	11.1	2,326	100.0
8/1	164	M	5	0.6	84	10.3	257	31.7	20	2.4	45	5.5	475	58.5
(8/1, 7, 10, 15,		F	10	1.2	40	4.9	228	28.1	0	0.0	44	5.5	336	41.5
17, 20, 24)		Subtotal	15	1.8	124	15.2	485	59.8	20	2.4	89	11.0	811	100.0
Season	539	M	60	1.0	761	12.1	1,671	26.5	357	5.7	411	6.5	3,570	56.6
		F	114	1.8	460	7.3	1,579	25.1	204	3.2	261	4.2	2,734	43.4
		Total	174	2.8	1221	19.4	3,250	51.6	561	8.9	672	10.7	6,304	100.0

Table 13. The mean length of sockeye salmon harvested in District W-5, 2002.

Sample Dates			Age Class				
(Stratum Dates)	Sex		0.3	1.2	1.3	1.4	2.3
6/27	M	Mean Length (mm)	629	531	597	614	592
(6/27, 7/1, 5)		Std. Error	-	3	3	5	9
		Range	629-629	509-557	551-666	568-643	533-657
		Sample Size	1	17	60	16	13
	F	Mean Length (mm)	574	521	558	576	562
		Std. Error	14	7	3	7	7
		Range	539-605	494-540	502-602	552-603	542-591
		Sample Size	4	6	53	7	7
7/10	M	Mean Length (mm)	541	526	589	602	592
(7/10, 12)		Std. Error	28	4	4	18	10
		Range	486-580	489-570	540-627	516-638	516-637
		Sample Size	3	31	34	6	12
	F	Mean Length (mm)	55	502	566	581	551
		Std. Error	2	6	4	6	9
		Range	553-559	426-550	517-612	567-615	511-584
		Sample Size	3	25	38	7	8
8/1	M	Mean Length (mm)	594	525	595	610	604
(8/1, 7, 10, 15,		Std. Error	-	7	4	1	11
17, 20, 24)		Range	594-594	474-578	509-644	607-612	566-679
		Sample Size	1	17	52	4	9
	F	Mean Length (mm)	567	497	567		565
		Std. Error	14	19	5		7
		Range	553-581	417-597	482-686		535-590
		Sample Size	2	8	46	0	9
Season	M	Mean Length (mm)	569	528	595	611	593
		Range	486-629	474-578	509-666	516-643	516-679
		Sample Size	5	65	146	26	34
	F	Mean Length (mm)	567	505	562	578	558
		Range	539-605	417-597	482-686	552-615	511-591
		Sample Size	9	39	137	14	24

Table 14. The age and sex composition of the chum salmon escapement at the Middle Fork Goodnews River weir, 2002.

Sample Dates	Sample		Age Class 0.2		0.3		0.4		0.5		Total	
(Stratum Dates)	Size	Sex	Esc.	%	Esc.	%	Esc.	%	Esc.	%	Esc.	%
6/30 - 7/1	183	M	0	0.0	876	10.9	3,417	42.6	87	1.1	4,381	54.6
(6/22 - 7/6)		F	0	0.0	1,008	12.6	2,585	32.3	44	0.5	3,636	45.4
		Subtotal	0	0.0	1,884	23.5	6,002	74.9	131	1.6	8,017	100.0
7/11	182	M	47	0.5	989	11.5	2,449	28.6	235	2.7	3,721	43.4
(7/7 - 15)		F	0	0.0	1,601	18.7	3,250	37.9	0	0.0	4,851	56.6
		Subtotal	47	0.5	2,590	30.2	5,699	66.5	235	2.7	8,572	100.0
7/19 – 21	174	M	158	1.7	1,578	17.3	1,946	21.3	53	0.6	3,735	40.8
(7/16 - 24)		F	105	1.2	2,841	31.0	2,473	27.0	0	0.0	5,419	59.2
		Subtotal	263	2.9	4,419	48.3	4,419	48.3	53	0.6	9,154	100.0
7/27-30	186	M	270	5.9	857	18.8	686	15.0	0	0.0	1,813	39.8
(7/25 - 9/18)		F	294	6.5	1,495	32.8	956	21.0	0	0.0	2,744	60.2
		Subtotal	564	12.4	2,352	51.6	1,642	36.0	0	0.0	4,557	100.0
Season	725	M	475	1.6	4,301	14.2	8,499	28.0	376	1.2	13,650	45.0
		F	399	1.3	6,944	22.9	9,262	30.6	44	0.2	16,650	55.0
		Total	874	2.9	11,245	37.1	17,761	58.6	420	1.4	30,300	100.0

Table 15. The mean length of the chum salmon escapement at the Middle Fork Goodnews River weir, 2002.

Sample Dates (Stratum Dates)	Sex		Age Class 0.2	0.3	0.4	0.5
6/30 - 7/1 (6/22 - 7/6)	M	Mean Length (mm)		600	632	650
		Std. Error		4	3	37
		Range		560- 628	546- 700	613- 687
		Sample Size	0	20	78	2
	F	Mean Length (mm)		583	598	575
		Std. Error		7	4	-
		Range		535- 670	527- 660	575- 575
		Sample Size	0	23	59	1
7/11 (7/7 - 15)	M	Mean Length (mm)	575	599	613	642
		Std. Error	-	5	4	22
		Range	575- 575	565- 635	550- 675	570- 705
		Sample Size	1	21	52	5
	F	Mean Length (mm)		575	587	
		Std. Error		3	2	
		Range		530- 620	550- 635	
		Sample Size	0	34	69	0
7/19 – 21 (7/16 - 24)	M	Mean Length (mm)	592	613	643	713
		Std. Error	21	8	8	-
		Range	555- 627	540- 688	550- 728	713- 713
		Sample Size	3	30	37	1
	F	Mean Length (mm)	579	579	602	
		Std. Error	29	4	5	
		Range	550- 607	515- 669	535- 674	
		Sample Size	2	54	47	0
7/27-30 (7/25 - 9/18)	M	Mean Length (mm)	588	595	614	
		Std. Error	12	6	6	
		Range	555- 688	505- 682	555- 674	
		Sample Size	11	35	28	0
	F	Mean Length (mm)	567	567	575	
		Std. Error	7	4	5	
		Range	517- 609	475- 685	500- 640	
		Sample Size	12	61	39	0
Season	M	Mean Length (mm)	588	604	628	654
		Range	555- 688	505- 688	546- 728	570- 713
		Sample Size	15	106	195	8
	F	Mean Length (mm)	570	576	593	575
		Range	517- 609	475- 685	500- 674	575- 575
		Sample Size	14	172	214	1

Table 16. The age and sex composition of chum salmon harvested in District W-5, 2002.

Sample Dates (Stratum Dates)	Sample Size	Sex	Age Class 0.2 Catch	0.2 %	0.3 Catch	0.3 %	0.4 Catch	0.4 %	Total Catch	Total %
6/27 (6/27 - 7/1)	49	M	0	0.0	511	30.6	340	20.4	852	51.0
		F	0	0.0	341	20.4	477	28.6	817	49.0
		Subtotal	0	0.0	852	51.0	817	49.0	1,669	100.0
7/5 (7/5 - 8/24)	185	M	12	0.5	437	20.5	357	16.7	817	38.4
		F	0	0.0	622	29.2	645	30.3	1,313	61.6
		Subtotal	12	0.5	1,059	49.7	1,002	47.0	2,130	100.0
Season	234	M	12	0.3	949	25.0	697	18.4	1,669	43.9
		F	0	0.0	962	25.3	1,122	29.5	2,130	56.1
		Total	12	0.3	1,911	50.3	1,819	47.9	3,799	100.0

Table 17. The mean length of chum salmon harvested in District W-5, 2002.

Sample Dates (Stratum Dates)	Sex		Age class 0.2	0.3	0.4
6/27 (6/27 - 7/1)	M	Mean Length (mm)		594	617
		Std. Error		6	8
		Range		561-638	573-663
		Sample Size	0	15	10
	F	Mean Length (mm)		579	589
		Std. Error		6	6
		Range		544-596	552-649
		Sample Size	0	10	14
7/5 (7/5 - 8/24)	M	Mean Length (mm)	534	588	609
		Std. Error	-	5	6
		Range	534-534	512-651	535-670
		Sample Size	1	38	31
	F	Mean Length (mm)		574	585
		Std. Error		4	4
		Range		521-690	546-696
		Sample Size	0	54	56
Season	M	Mean Length (mm)	534	592	613
		Range	534-534	512-651	535-670
		Sample Size	1	53	41
				52	
	F	Mean Length (mm)		576	587
		Range		521-690	546-696
		Sample Size	0	64	70

Table 18. Daily environmental and hydrological conditions, Middle Fork Goodnews River weir, 2002.

			Wind		Temp. (C)		Water
Date	Sky[1]	Precip. (mm)	Dir	Speed (knts)	air (low/hi)	Water	Level (cm)[2]
6/7	b		e	25		6	65
6/8	oc	t	e	25		6	63
6/9	oc	7	e	10	0/18	6	64
6/10	oc	1.6	se	10	1/19	6	78
6/11	oc	0.2			1/16	6	79
6/12	c	t	w	5	11/14	7	69
6/13	c		w	10	9/12	8	64
6/14	c		se	10	9/14	9	60
6/15	c		s	10	8/16	9	58
6/16	s				1/14	10	56
6/17	c				-1/16	10	54
6/18	oc		w	5	-2/12	9	52
6/19	oc		w	10	8/11	8	50
6/20	s	t			8/12	9	46
6/21	s	0	sw	15	3/12	8	43
6/22	b	t			5/8	9	40
6/23	s	1.4			-2/14	10	39
6/24	b	2.4			3/11	10	37
6/25	s	2			-3/15	10	38
6/26	oc	0	e	10	1/12	10	39
6/27	b	t			-2/11	11	39
6/28	s	0	e	5	-1/27	10	39
6/29	s	0	e	5	2/26	11	38
6/30	s	0	ne	5	5/25	12	35
7/1	oc	0	nw	10	8/12	12	34
7/2	c	0	w	5	4/22	12	31
7/3	oc	0	sw	15	6/19	11	30
7/4	oc	0	sw	10	8/18	11	29
7/5	oc	t	sw	10	6/15	10	29
7/6	oc	t	se	10	6/14	10	27
7/7	oc	0.8	se	10	8/13	10	27
7/8	oc	0.5			7/15	9	26
7/9	b	0			7/17	10	25
7/10	oc	3.7	sw	5	6/19	10	24
7/11	b	6	sw	10	7/18	10	24
7/12	oc		e	10	0/16	11	22
7/13	oc	5.7	e	5	10/12	10	22
7/14	oc	0.4	e	10	10/13	10	24
7/15	oc	1.5			9/21	11	23
7/16	b		sw	7	8/19	12	22
7/17	s		nw	10	5/26	12	20
7/18	s		w	3	5/27	13	20
7/19	oc	5.9	se	10	10/15	13	21

continued

Table 18 continued (2 of 3)

Date	Sky[1]	Precip. (mm)	Wind Dir	Wind Speed (knts)	Temp. (C) air (low/hi)	Temp. (C) Water	Water Level (cm)[2]
7/20	oc	4.8	se	5	11/20	11	24
7/21	oc		se	13	12/17	11	21
7/22	oc	1.9	e	10	11/18	11	20
7/23	oc	1.3	e	9	11/16	12	22
7/24	s	9.4	sw	9	8/17	11	26
7/25	oc	0.2	ne	11	9/13	11	25
7/26	oc	5.9	se	7	9/15	10	26
7/27	oc	10.4	nw	7		10	30
7/28					9/15		
7/29	s	0.7	nw	6	2/22	11	29
7/30	c		ne	5	1/26	12	27
7/31	c				2/26	13	26
8/1	c		sw	7	3/25	14	24
8/2	c		sw	7	8/29	14	23
8/3	c		e	15	4/27	14	22
8/4	b		ne	15	11/24	13	20
8/5	oc	10.6			11/15	13	21
8/6	oc	0.6	w	10	7/16	12	22
8/7	c	0.7	nw	10	9/20	12	20
8/8	oc	0.4	nw	5	5/18	12	19
8/9	s	1.6	w	9	5/18	13	18
8/10	oc		ne	9	5/17	11	17
8/11	oc	1.8			9/13	11	17
8/12	oc	3.7	ne	5	7/20	11	16
8/13	oc				2/20	11	16
8/14	oc		e	4	4/18	11	15
8/15	s	5	nw	5	8/18	11	16
8/16	s	0.2	n	3	4/21	11	14
8/17	oc		n	2	4/17	11	14
8/18	oc	0.2	sw	7	10/16	11	13
8/19	oc	4.4			9/14	11	13
8/20	oc	11.2	e	10	11/15	11	16
8/21	oc	1.9	n	10	9/16	11	17
8/22	oc		nw	7	9/15	11	16
8/23	s	0.8			8/19	11	19
8/24	oc	1.4	e	8		11	18
8/25	s	0.5			1/19	12	17
8/26	c	0.5	ne	4	-1/21	10	17
8/27	b	0.5			-1/20	10	16
8/28	s	4.5			-1/19	10	15
8/29	oc	0.5			1/13	10	14
8/30	b	1.8	w	4		10	13
8/31	s	7.2				10	14
9/1	s	1			0/18	10	15
9/2	s	0.2	ne	6	1/19	10	14

continued

Table 18 continued (3 of 3)

Date	Sky[1]	Precip. (mm)	Dir	Speed (knts)	air (low/hi)	Water	Level (cm)[2]
9/3	oc	0	s	7	1/16	10	12
9/4	oc	6.2	s	13	11/14	11	12
9/5	oc	2	sw	6	9/12	10	14
9/6	oc	13.4	sw	10	9/14	10	18
9/7	oc	20.2	w	5	8/16	10	24
9/8	b	0.7	ne	15	1/14	9	24
9/9	b				-1/16	8	22
9/10	b	0.2	w	5	-2/12	8	19
9/11	oc	14.3	sw	10	8/11	8	20
9/12	oc	18	s	20	8/12	8	28
9/13	oc	t			3/12	9	36
9/14	oc	7.1	nw	20	5/8	8	37
9/15	b	t	s	5	-2/14	7	37
9/16	oc	0.1	ne	5	3/11	8	36
9/17	c	2.9			-3/15	6	35
9/18	s		nw	15	1/12	6	32
9/19	b	0.2	nw	5	-2/11	6	29

[1] oc: overcast, b: broken, c: cloudy, s: scattered, c: clear.

[2] Water level is measured relative to a benchmark established at 150 cm.

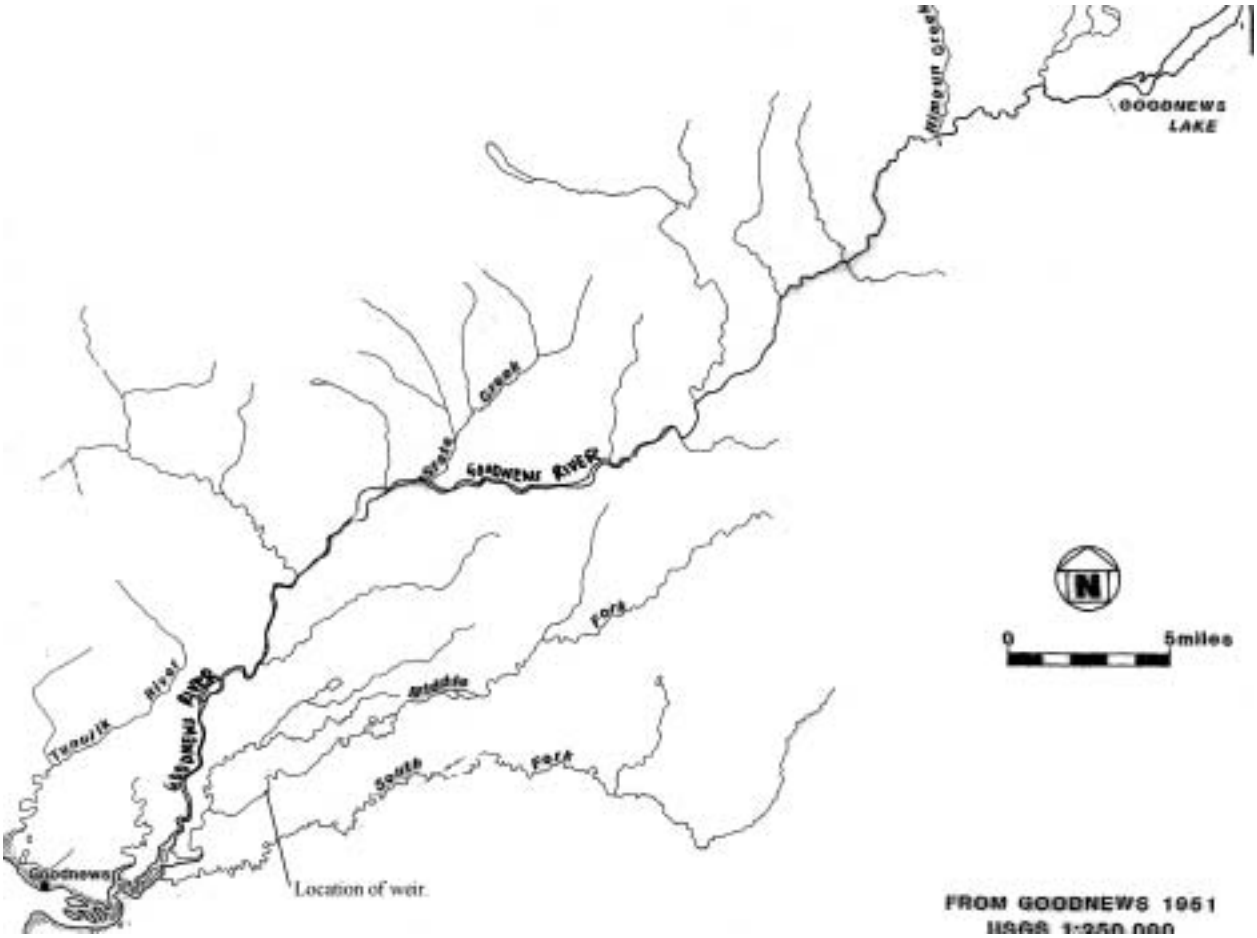

Figure 1. Map of Goodnews River drainage.

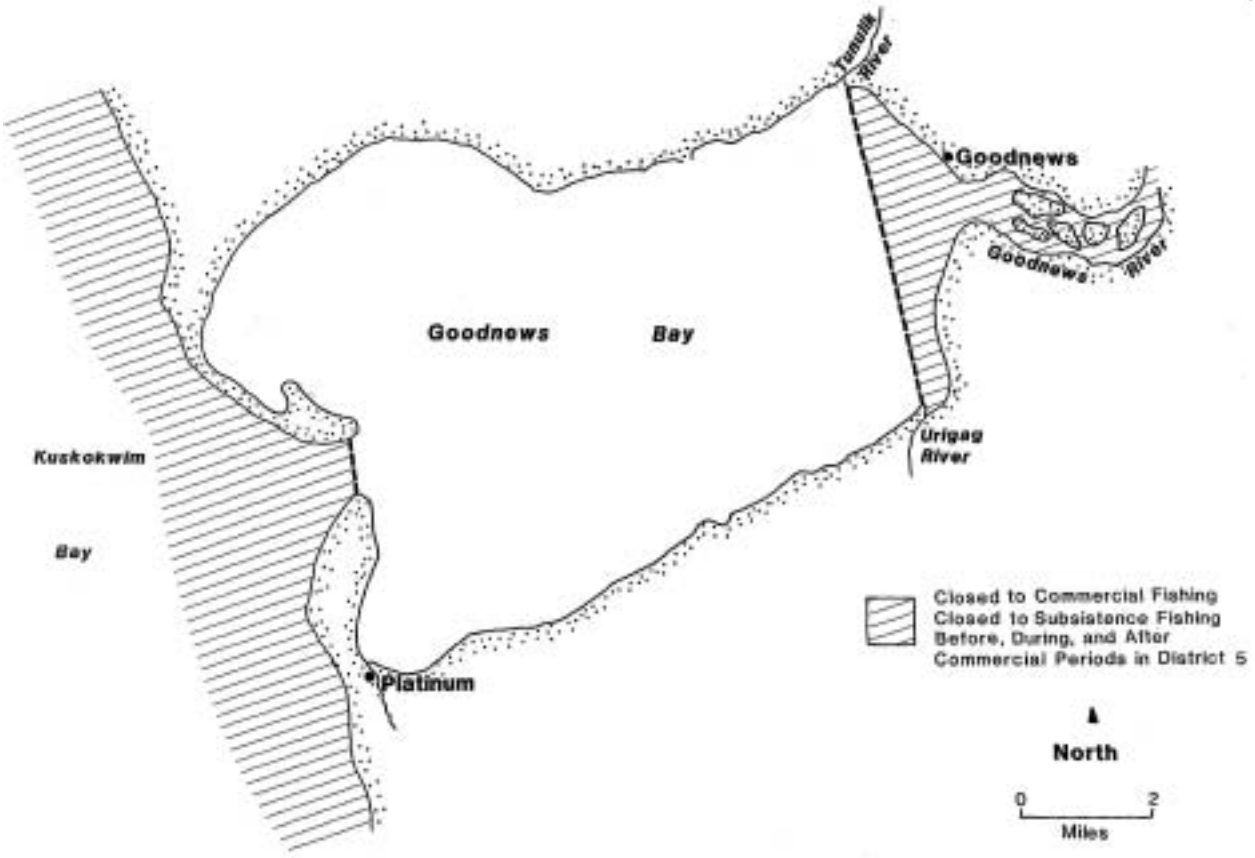

Figure 2. Map of District 5 (Goodnews Bay).

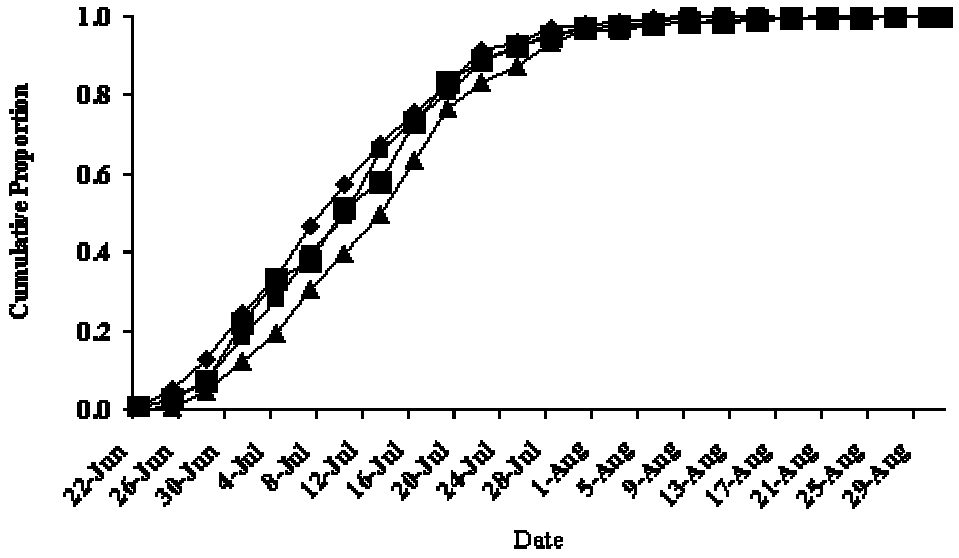

Figure 3. Chinook salmon run timing at the MFGRW in 2002 compared to early, normal, and late run timing based on historical run timing information. The large squares represent 2002 run timing,diamonds early run timing, small squares normal run timing, and the triangles late run timing

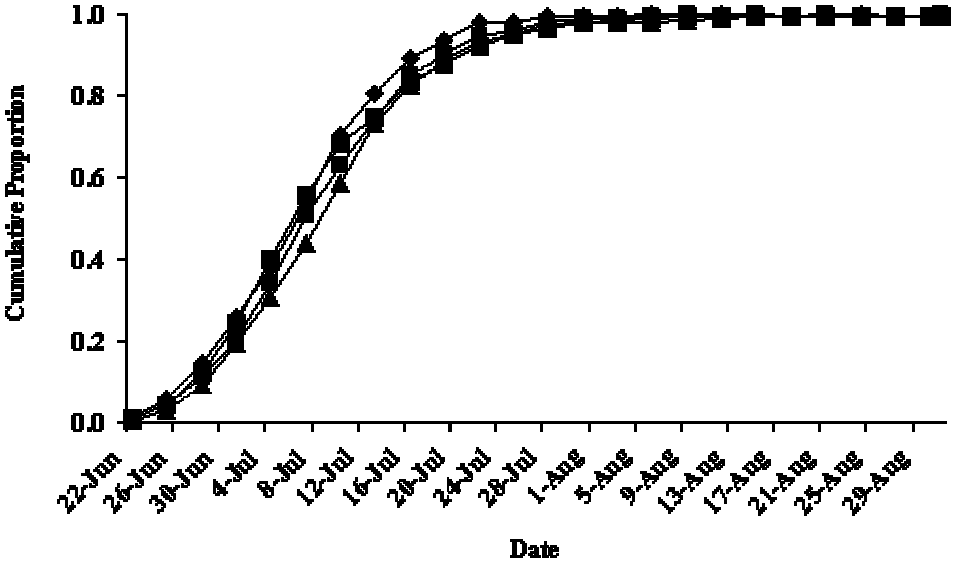

Figure 4. Sockeye salmon run timing at the MFGRW in 2002 compared to early, normal, and late run timing based on historical run timing information. The large squares represent 2002 run timing, diamonds early run timing, small squares normal run timing, and the triangles late run timing.

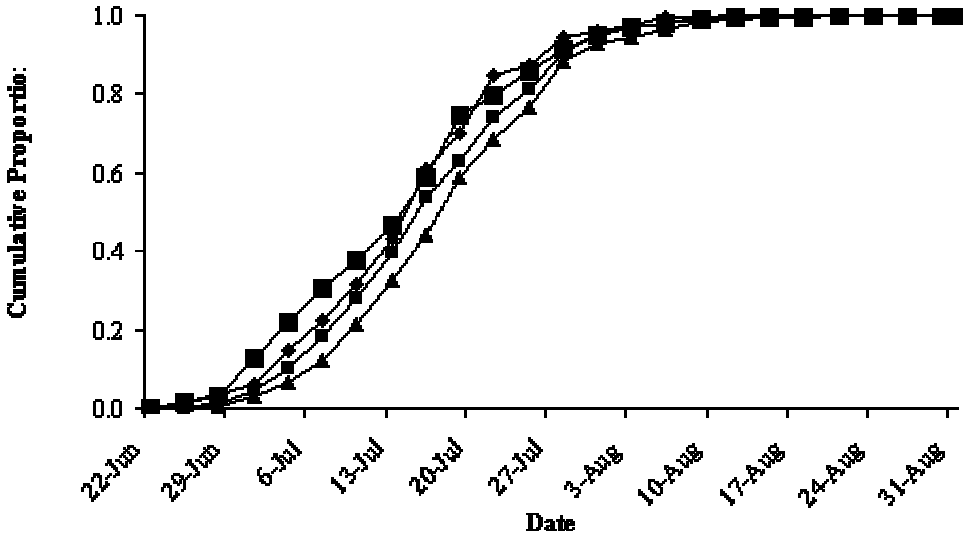

Figure 5. Chum salmon run timing at the MFGRW in 2002 compared to early, normal, and late run timing based on historical run timing information. Large squares represent 2002 run timing, diamonds early run timing, small squares normal run timing, and the triangles late run timing.

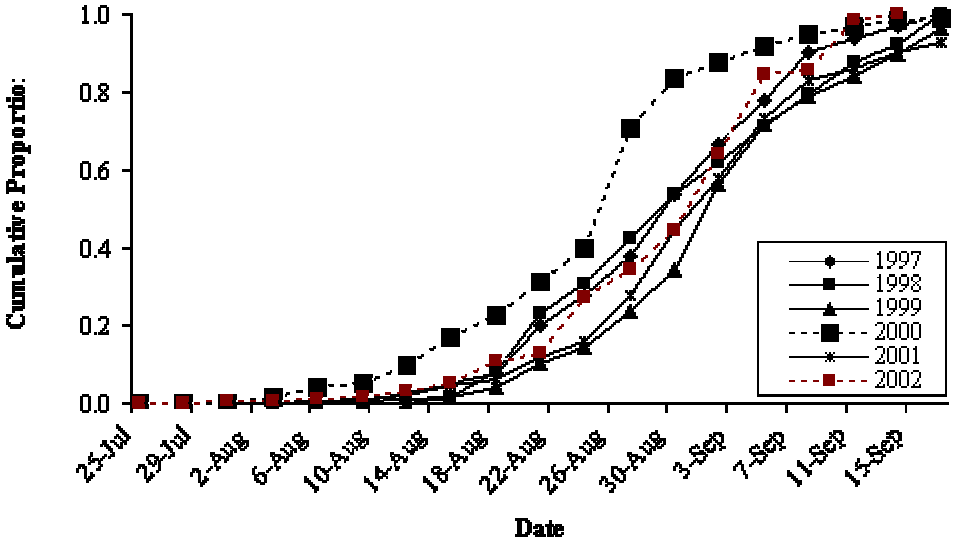

Figure 6. Coho salmon run timing at the MFGRW in 2002 compared to early, normal, and late run timing based on historical run timing information.

Appendix 1. Commercial salmon harvests, District W-5, 1968-2002.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1968			5,458			5,458
1969	3,978	6,256	11,631	298	5,006	27,169
1970	7,163	7,144	6,794	12,183	12,346	45,630
1971	477	330	1,771	0	301	2,879
1972	264	924	925	66	1,331	3,510
1973	3,543	2,072	5,017	324	15,781	26,737
1974	3,302	9,357	21,340	16,373	8,942	59,314
1975	2,156	9,098	17,889	419	5,904	35,466
1976	4,417	5,575	9,852	8,453	10,354	38,651
1977	3,336	3,723	13,335	29	6,531	26,954
1978	5,218	5,412	13,764	9,103	8,590	42,087
1979	3,204	19,581	42,098	201	9,298	74,382
1980	2,331	28,632	43,256	7,832	11,748	93,799
1981	7,190	40,273	19,749	11	13,642	80,865
1982	9,476	38,877	46,683	4,673	13,829	113,538
1983	14,117	11,716	19,660	0	6,766	52,259
1984	8,612	15,474	71,176	4,711	14,340	114,313
1985	5,793	6,698	16,498	8	4,784	33,781
1986	2,723	25,112	19,378	4,447	10,355	62,015
1987	3,357	27,758	29,057	54	20,381	80,607
1988	4,964	36,368	30,832	5,509	33,059	110,732
1989	2,966	19,299	31,849	82	13,622	67,818
1990	3,303	35,823	7,804	629	13,194	60,753
1991	912	39,838	13,312	29	15,892	69,983
1992	3,528	39,194	19,875	14,310	18,520	95,427
1993	2,117	59,293	20,014	0	10,657	92,081
1994	2,570	69,490	47,499	18,017	28,477	166,053
1995	2,922	37,351	17,875	39	19,832	78,019
1996	1,375	30,717	43,836	22	11,093	87,043
1997	2,039	31,451	2,983	0	11,729	48,202
1998	3,675	27,161	21,246	411	14,155	66,648
1999	1,888	22,910	2,474	0	11,562	38,834
2000	4,442	37,252	15,531	7	7,450	64,682
2001	1,519	25,654	9,275	0	3,412	39,860
2002	979	6,304	3,041	0	3,799	14,123
10-year avg.	2,608	38,047	20,061	5461[a]	13,689	77,685
Historic avg.	3,905	23,509	20,580	6279[a]	11,906	61,928

[a] Average of even years only

Appendix 2. Number of permits fished, and fishing time, District W-5, 1970-2002.

Year	Number of Periods	Fishing Hours	Number of Permits Fished
1970	28	624	35
1971	3	156	16
1972	8	186	14
1973	24	288	21
1974	30	360	49
1975	24	288	50
1976	32	384	40
1977	24	288	34
1978	36	432	35
1979	36	432	30
1980	38	456	48
1981	34	492	48
1982	34	540	48
1983	28	336	79
1984	31	372	77
1985	22	264	69
1986	30	360	86
1987	21	252	69
1988	30	360	125
1989	28	336	88
1990	28	396	82
1991	27	432	72
1992	26	396	111
1993	28	336	114
1994	32	432	116
1995	25	396	118
1996	21	247	53
1997	23	276	54
1998	29	348	50
1999	20	240	73
2000	25	300	46
2001	16	183	32
2002	12	144	30
10-year avg	25	315	77
Historic avg	26	343	61

Appendix 3. Exvessel value of the District 5 commercial salmon fishery, 1990-2002.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1990	32,135	263,598	38,910	254	25,767	360,664
1991	8,370	187,622	47,519	14	31,394	274,919
1992	30,688	257,457	75,278	2,913	39,111	405,447
1993	21,351	296,437	95,043	0	28,304	441,135
1994	21,732	309,577	271,687	5,442	41,309	649,747
1995	31,339	175,552	58,061	19	21,427	286,398
1996	5,952	87,427	120,191	4	9,015	222,589
1997	10,867	93,146	9,497	0	9,358	122,868
1998	13,685	100,171	59,102	174	11,133	184,265
1999	9,020	78,800	7,515	0	8,327	103,662
2000	25,614	146,708	34,689	2	6,001	213,014
2001	10,496	68,678	17,089	0	2,586	98,849
2002	343	15,846	5,634	0	2,979	24,802
Historical Avg (92-01)	$18,074	$161,395	$74,815	$1,707[a]	$17,657	$272,797

[a] Even years only.

Appendix A.4. Chinook, sockeye, and chum salmon run size and exploitation rate, Goodnews River drainage, 1981-2002.

Year	Species	MFGR Tower/weir estimatea	Goodnews River Escapement	Subsistence Harvest	Commercial Harvest	Sport Harvest[b]	Total Run Size	Exploitation[c] (%)
	Chinook	3,688	7,766 [d]	1,409	7,190		20,053	43
1981	Sockeye	49,108	100,029 [d]	3,511 [d]	40,273		192,921	23
	Chum	21,827	53,799 [d]	-	13,642		89,268	15
	Chinook	1,395	2,937 [d]	1,236	9,476		15,044	71
1982	Sockeye	56,255	114,587 [d]	2,754	38,877		212,473	20
	Chum	6,767	16,679 [d]	-	13,829		37,275	37
	Chinook	6,022	14,398	1,066	14,117	31	35,634	43
1983	Sockeye	25,813	69,955	1,518 [e]	11,716	14	109,016	12
	Chum	15,548	38,323 [d]	-	6,766	10	60,647	11
	Chinook	3,260	8,743	629	8,612		21,244	43
1984	Sockeye	32,053	67,213	964	15,474		115,704	14
	Chum	19,003	117,739	189	14,340		151,271	10
	Chinook	2,831	7,979	426	5,793	323	17,352	38
1985	Sockeye	24,131	50,481	704	6,698	75	82,089	9
	Chum	10,367	25,025	348	4,784	124	40,648	13
	Chinook	2,092	4,094	555	2,723		9,464	35
1986	Sockeye	51,069	93,228	942	25,112	122	170,473	15
	Chum	14,764	51,910	191	10,355		77,220	14
	Chinook	2,272	4,490	816	3,357		10,935	38
1987	Sockeye	28,871	51,989	955	27,758	266	109,839	26
	Chum	17,517	37,802	578	20,381		76,278	27
	Chinook	2,712	5,419	310	4,964		13,405	39
1988	Sockeye	15,799	38,319	1065	36,368		91,551	41
	Chum	20,799	39,501	448	33,059		93,807	36
	Chinook	1,915	2,891	467	2,966	68	8,307	42
1989	Sockeye	21,186	35,476	869	19,299	146	76,976	26
	Chum	10,380	15,495	760	13,622	0	40,257	36

Continued-

Appendix 4 continued (page 2 of 2)

Year	Species	MFGR Tower/weir estimatea	Goodnews River Escapement	Subsistence Harvest	Commercial Harvest	Sport Harvest[b]	Total Run Size	Exploitation[c] (%)
	Chinook	3,636	7,656 [d]	682	3,303		15,277	26
1990	Sockeye	31,679	64,528 [d]	905	35,823		132,935	28
	Chum	6,410	15,799 [d]	342	13,194		35,745	38
	Chinook	1,952	4,521 [d]	682	912	29	8,096	20
1991	Sockeye	47,397	96,544 [d]	900	39,838	163	184,842	22
	Chum	27,525	67,844 [d]	106	15,892	215	111,582	14
	Chinook	1,903	1,854	252	3,528		7,537	50
1992	Sockeye	27,268	52,501	905	39,194		119,868	33
	Chum	22,023	16,084	662	18,520		57,289	33
	Chinook	2,349	4,727 [d]	488	2,117	104	9,785	28
1993	Sockeye	26,452	54,325 [d]	572	59,293	69	140,711	43
	Chum	14,952	38,061 [d]	133	10,657	202	64,011	17
	Chinook	3,856	7,866 [d]	657	2,570	175	15,124	22
1994	Sockeye	55,751	115,405 [d]	652	69,490	80	241,378	29
	Chum	34,849	91,653 [d]	402	28,477	34	155,415	19
	Chinook	4,836	9,865 [d]	552	2,922	55	18,230	19
1995	Sockeye	39,009	80,749 [d]	787	37,351	53	157,949	24
	Chum	33,699	88,628 [d]	329	19,832	16	142,504	14
	Chinook	2,930	5,977 [d]	526	1,375	213	11,021	19
1996	Sockeye	58,264	120,606 [d]	763	30,717	143	210,493	15
	Chum	40,450	106,384 [d]	326	11,093	18	158,271	7
	Chinook	2,937	7,216	449	2,039	164	12,641	20
1997	Sockeye	35,530	23,462	609	31,451	142	91,052	35
	Chum	17,296	45,488 [d]	133	11,729	80	74,646	16

continued

Appendix 4 continued (page 2 of 2)

Year	Species	MFGR Tower/weir estimate[a]	Goodnews River Escapement	Subsistence Harvest	Commercial Harvest	Sport Harvest[b]	Total Run Size	Exploitation[c] (%)
	Chinook	4,584	3,797	718	3,675	590	13,364	37
1998	Sockeye	47,951	14,693	508	27,161	672	90,985	31
	Chum	28,905	24,940	316	14,155	198	68,514	21
	Chinook	3,221	6,565 [d]	871	1,888	414	12,959	24
1999	Sockeye	48,205	99,727 [d]	872	22,910	661	172,375	14
	Chum	19,533	51,361 [d]	281	11,562	425	83,162	15
	Chinook	3,295	6,458 [d]	601	4,442	319	15,115	35
2000	Sockeye	42,197	73,845 [d]	1,028	37,252	132	154,454	25
	Chum	14,720	35,475 [d]	280	7,450	224	58,149	14
	Chinook	5,404	8,128	853	1,519	285	16,189	16
2001	Sockeye	22,495	137,364	914	25,654	164	186,591	14
	Chum	26,829	33,902	181	3,412	130	64,454	6
	Chinook	3,076	4,096		979			
2002	Sockeye	21,127	31,476		6,304			
	Chum	29,905	110,215		3,799			

[a] Goodnews Tower Project changed to weir project in 1991.

[b] Sport fish harvest is the number of fish harvested plus 5% of the total fish caught, assuming a 5% delayed mortality.

[c] Commercial, subsistence, and sport harvest exploitation.

[d] Average Middle Fork/Goodnews River escapement estimate ratio for 1983-1989 used to estimate Goodnews River escapement in years when no aerial survey of the Goodnews River was flown.

[e] Subsistence caught chum salmon is included in subsistence sockeye salmon harvest

Appendix 5. Percentage of salmon escapement estimated at the Middle Fork Goodnews River weir, 1991-2002.

Year	Operating Period[a]	Chinook	Sockeye	Coho[b]	Pink	Chum
1991	June 29 - Aug 25	0	15	0	0	2
1992	June 21 - Aug 16	29	43	0	3	15
1993	June 22 - Aug 18	14	22	0	0	8
1994	June 22 - Aug 16	20	16	0	0	20
1995	June 19 - Aug 28	0	0	0	0	0
1996	June 18 - Aug 23	26	24	11	28	27
1997	June 12 - Sept 17	2	1	0	0	8
1998	July 04 - Sept 17	32	32	3	0	11
1999	June 25 - Sept 26	0	0	0	0	0
2000	July 02 - Sept 22	24	23	0	0	6
2001	June 26- Sept 30	1	7	0	0	0
2002	June 25- Sept 18	4	4	0	0	1

[a] Estimates were made for some species when the weir was not operational from June 15 through August 16. Previous to 1991, the project was a counting tower and the majority of the escapement was estimated based on a systematic counting schedule.

[b] The coho escapement continues into October and the majority of the run was not counted (except in 1997, 1998, 1999, 2000, and 2001). In 1999 the weir was out for 10 days in early August because of flooding.

Appendix 6. Aerial survey results, Middle Fork and Goodnews Rivers and Lakes, 1980-2002.

	Middle Fork Goodnews River and Lake				Goodnews River and Lakes			
Year	Chinook	Sockeye	Chum	Coho	Chinook	Sockeye	Chum	Coho
1980	1,228	75,639	1,975	[a]	1,164	18,926	3,782	[a]
1981	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1982	1,990	19,160	9,700	[a]	1,546	2,327	6,300	[a]
1983	2,600	9,650	a	[a]	2,500	5,900	[a]	[a]
1984	3,245	9,240	17,250	43,925	1,930	12,897	9,172	[a]
1985	3,535	2,843	4,415	[a]	2,050	5,470	3,593	[a]
1986	1,068	8,960	11,850	[a]	1,249	16,990	7,645	[a]
1987	2,234	19,786	12,103	11,122	2,222	34,585	9,696	[a]
1988	637	5,820	3,846	[a]	1,024	5,831	5,814	[a]
1989	651	3,605	[a]	[a]	1,277	8,044	2,922	[a]
1990	626	27,689	[a]	[a]	[a]	[a]	[a]	[a]
1991	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1992	875	10,397	1,950	[a]	1,012	7,200	3,270	[a]
1993	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1994	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1995	3,314	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1996	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1997	3,611	12,610	[a]	[a]	1,447	19,843	[a]	[a]
1998	578	3,497	2,743	[a]	731	11,632	3,619	[a]
1999	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
2000	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
2001	2,799	12,383	6,945	[a]	3,561	29,340	7,330	[a]
2002	1,195	2,626	1,208		1,470	3,475	3,075	[a]
Goal	**800**	**5,000**	**4,000**	**2,000**	**1,600**	**15,000**	**17,000**	**15,000**

[a] Survey was not flown.